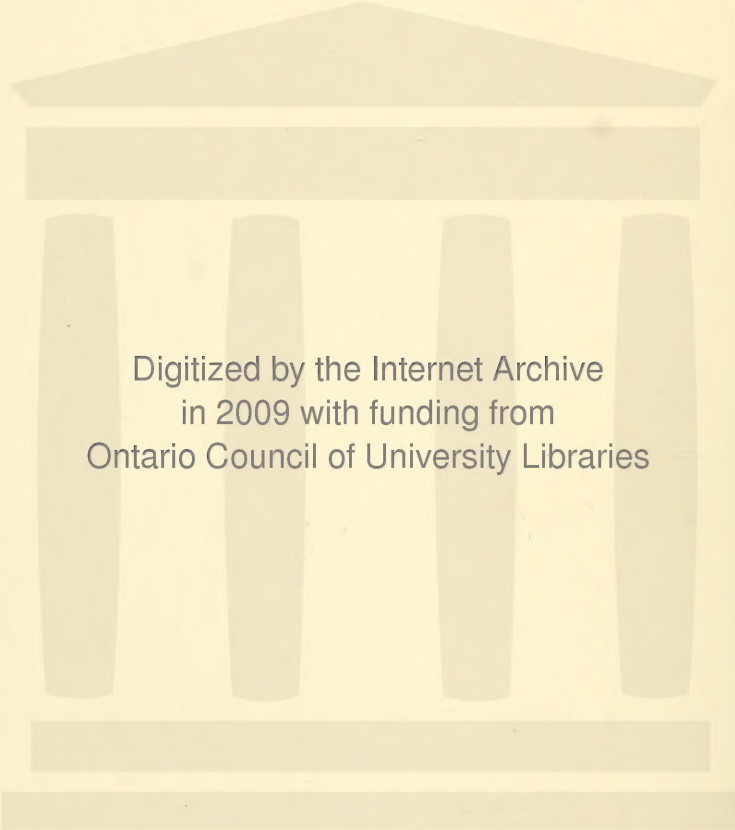


LABORATORY APPARATUS  
AND  
REAGENTS

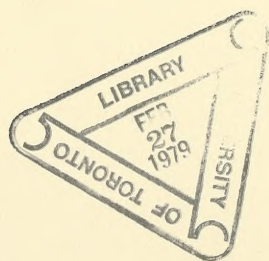
ARTHUR H. THOMAS COMPANY  
WEST WASHINGTON SQUARE  
PHILADELPHIA  
U. S. A.



Digitized by the Internet Archive  
in 2009 with funding from  
Ontario Council of University Libraries







Q  
184  
L 35  
1914



# LABORATORY APPARATUS AND REAGENTS

SELECTED FOR LABORATORIES OF  
CHEMISTRY AND BIOLOGY

IN THEIR APPLICATION TO  
EDUCATION, THE INDUSTRIES, MEDICINE AND  
THE PUBLIC HEALTH

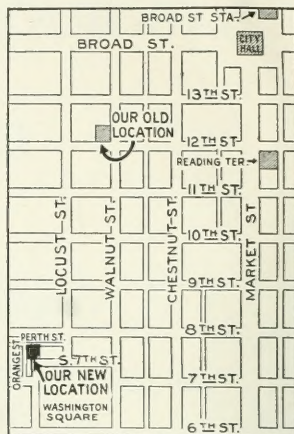
INCLUDING SOME EQUIPMENT FOR  
METALLURGY, MINERALOGY, THE TESTING OF  
MATERIALS, AND OPTICAL PROJECTION

EDITION OF 1914  
COPYRIGHT, 1914, BY THE  
ARTHUR H. THOMAS COMPANY

ARTHUR H. THOMAS COMPANY  
WEST WASHINGTON SQUARE  
(230 SOUTH SEVENTH ST.)  
PHILADELPHIA  
U. S. A.



Washington Square Front of Building



How to Find Us

In December, 1912, we moved to the Farm Journal Building, a new concrete, fire-proof structure located on West Washington Square (230-2-4 South Seventh Street), a neighborhood which has become the publishing centre of Philadelphia. The fourth and fifth floors of the building and a portion of the basement were designed and built with special reference to the requirements of our business. The increase of our total floor space to 40,000 sq. ft. (two and one-half times that occupied by us at Twelfth and Walnut Sts.) has distinctly increased the general efficiency of our service.

Of the above mentioned space approximately 8400 sq. ft. is devoted to salesroom and offices. In this salesroom we maintain a permanent exhibit of over 6,000 different pieces of Laboratory Apparatus, all conveniently arranged for inspection and handling by our visitors. A dark room is provided for the demonstration of Projection and Photo-Micrographic Apparatus. Our office space is well lighted and ventilated and contributes to the comfort and welfare of our employees as well as to the thoroughness of their work. Some interior views of our establishment are to be found on various pages throughout the catalogue.



Washington Square Side of Showroom Looking North



## PREFACE.

We believe that the principles underlying the organization and daily conduct of our business are understood and generally endorsed by those familiar with them. The following discussion is, therefore, offered chiefly for the information of those hitherto without experience in dealing with us.

**PRICES**—The prices throughout this catalogue are subject to change without notice. This is largely because the goods listed originate in over twelve hundred factories and in many instances we have no control over either the cost or the selling price. Certain discounts are allowed from our list prices to Institutions, State, City and U. S. Government Departments, Industrial Concerns and other organized establishments, conducting regular laboratory work, because of their aggregate annual purchasing power. These discounts are not allowed on occasional purchases of a few items only by those not regularly connected with laboratory work. Our discount sheet will be published at frequent intervals and important changes in both list price and discount noted therein. Prices on items not regularly carried in stock and designated "Duty Free" and "Duty Paid" are subject to more variation than regular stock prices because they are directly dependent upon the size of the individual order. (See also paragraph "Duty Free Importation" below.) They are printed for the guidance of customers in ascertaining the cost of individual items apart from large importation orders and in most instances the prices given apply to the importation of a single item of the article listed.

**BREAKAGE AND SHORTAGE**—We make no claim as to our infallibility and, while our goods are checked and packed by experienced employees under rigid control, breakages and shortages occasionally occur because of defective packing or of our mistakes. When such claims are clearly and promptly presented to us it is our custom to adjust them without undue argument as we desire to subordinate literal terms of contract to an underlying spirit of fairness and to maintain our interest in each transaction until our customer receives full satisfaction and value, no matter where or when our technical responsibility may end. We further assist in presenting established claims against the transportation companies from which we hold receipts for shipments. Customers will greatly facilitate the adjustment of such claims by refusing to receipt for goods received in damaged condition, until they have been examined and condition noted by the local freight or express agent.

**STOCK**—Unless otherwise designated the goods in this catalogue are mostly in stock for immediate delivery. A few domestic items of great weight or bulk are not always on hand but prompt factory delivery is usually possible. In addition, there are certain articles of European origin listed with both duty free and duty paid prices. Such designation indicates that they are not regularly carried in stock, usually because the demand for them is confined to institutions entitled to duty free importation. Where the word "Stock" is used the article is regularly carried in stock and the duty free price printed for the convenience of those entitled to it.

**DUTY FREE IMPORTATION SERVICE**—Under Paragraphs 573 and 654 of the Tariff Act of 1913 apparatus of foreign origin may be imported for Educational Institutions free of U. S. Customs duties under certain regulations established by the U. S. Treasury Department. The conduct of such importations is a special feature of our business and we believe our service in the carrying out of the many technicalities required is a great convenience to our customers. Duty free importations through our medium are usually handled at less expense, frequently at some saving in time and always with much less trouble, than when orders are placed directly. Duty Free prices f.o.b. Philadelphia on general lists of apparatus can not be printed either in our catalogue or on our discount sheet as ocean freights on such goods are mostly paid by the cubic meter and the delivered rate per unit of foreign currency depends, therefore, directly upon the relation between the bulk and value of any given shipment. All duty free quotations are made subject to the rulings of the Collector of the Port at which entry is made and the prevailing regulations established by the U. S. Treasury Department, and we do not guarantee duty free entry under any circumstances. Under the present ruling of the U. S. Treasury Department, which has been supported in the U. S. Courts, Hospitals, even when training schools for nurses are connected therewith, may not import free of duty.

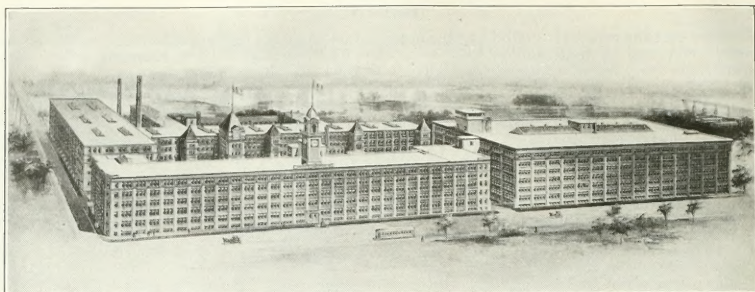
**RETURN OF GOODS**—Customers are requested not to return goods for any reason until after communication is had with us. When the return is arranged suitable tags are sent which when attached to the articles in question insure prompt credit, repair or exchange, as indicated. The time involved in such preliminary arrangement is insignificant compared with the time and labor required to establish the identity and disposal of goods sent us without such precaution.

**SHIPMENTS**—Where no instructions are furnished with order we exercise our own judgment as to method of shipment, i.e., via rail, boat, parcel post, etc. All shipments are made in accordance with the regulations of the Interstate Commerce Commission and insurance only effected when specific directions are given, except in parcel post shipments which are automatically insured against both loss and breakage under a blanket policy, the small charge for such insurance being included on bills.

Our business is confined to the buying and selling of Apparatus and Reagents, mostly within the limits mentioned on the title page of this catalogue. We are not scientists, inventors or manufacturers and we are not equipped to design and experimentally develop scientific apparatus. We believe such work is properly done by the scientist in his laboratory, the manufacturer in his shop, or by the two in cooperation and that the function of the dealer advantageously begins only after such work is completed. We are ready whenever possible to facilitate cooperation between the scientist with ideas for development and selected manufacturers with facilities applying thereto. We own no patents, have part in no monopolies and all of the merchandise offered herein is obtainable either directly from the makers or through other dealers whenever our services fail in their operation toward the convenience, economy and general satisfaction of the purchaser.

A preface applying specifically to our business in Reagents is printed with the Reagent section of this Catalogue.

ARTHUR H. THOMAS COMPANY.

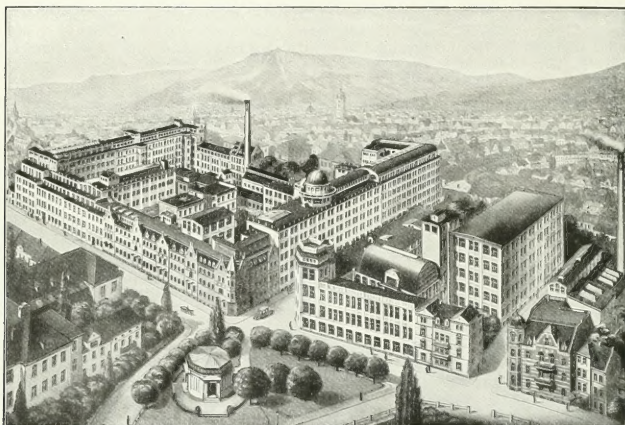


Bausch & Lomb Optical Company Works

**BAUSCH & LOMB OPTICAL COMPANY**—Under an arrangement in successful operation for the past fourteen years, we carry in stock in Philadelphia a complete line of Microscopes, Microtomes, Projection and Photo-Micrographic Apparatus as manufactured by the Bausch & Lomb Optical Company, of Rochester, N. Y. We distribute these products in Pennsylvania, New Jersey and the Southern states, at original factory prices, thereby saving customers in this territory both time and transportation expense. While nearly all of these goods are listed in this catalogue, we have for free distribution the following original Bausch and Lomb catalogues in editions specially prepared for us.

Microscopes and Accessories  
Microtomes

Photo-Micrographic Apparatus  
Projection Apparatus



Carl Zeiss Works

**CARL ZEISS, JENA**—Since 1899 we have been direct importers of all Zeiss products as applied to laboratory work. We carry in duty paid stock for immediate delivery a large assortment of Microscopes and Accessories, Refractometers, Haemacytometers, etc., at factory prices plus duty and transportation. All duty free importations of Zeiss products are handled by us at the minimum rate of 25¢ per Mark, f.o.b. Philadelphia. The catalogues, pamphlets and reprints of scientific articles published by the firm of Carl Zeiss constitute a distinct addition to scientific literature. We carry a complete assortment of these publications on hand for immediate distribution free of charge to scientists in the United States and publish from time to time a complete list thereof. We mention some of the more important catalogues and pamphlets as follows:—

Mikro 184. Microscopes and Accessories.  
Mikro 227-231. Ultra-Microscopy and Dark-ground Illumination Apparatus.  
Mikro 264. Photo-Micrographic Apparatus.  
Mikro 239. Large Projection Apparatus.  
Mikro 170 and 234. Photo-Micrographic Outfit for Ultra-Violet Light and Supplement to same.

Mikro 243. Epidiascope for the Projection of Opaque Objects, Microscopic Objects and Lantern Slides.  
Mess. 160. Optical Measuring Instruments.  
Mess. 165. Dipping Refractometer.  
Mess. 172. Abbe Refractometer.  
Mess. 173. Butler Refractometer.  
Mess. 188. Pulfrich Refractometer.



## IMPORTATION SERVICE FROM SPECIFIED EUROPEAN MAKERS

An important feature of our business is the importation service from specified European manufacturers of scientific instruments whose catalogues we supply to intending purchasers and whose goods we furnish at net factory prices plus our actual cost of importation, which is in most instances distinctly less than when orders are placed directly. This service is for obvious reasons much wider in its scope than is our business as described on the title page of this catalogue and we maintain a reference file containing catalogues from over seven hundred European manufacturers. Our profit on importation orders from specified makers is confined to the discount allowed us by the maker and in no case do we advance the factory prices except by the addition of U. S. Customs duty in duty paid importations, and in all importations by the addition of transportation charges. We mention below a few European makers of reputation whose catalogues are regularly supplied us for distribution.

- Eugen Albrecht, Physiological Apparatus after Hürthle, etc.  
 Montaudon, Auzoux Models of Human and Comparative Anatomy.  
 R. Brendel, Botanical and Zoological Models.  
 Cambridge Scientific Instrument Co., Electrical Measuring Instruments, Duddell Oscillograph, Einthoven Galvanometers, Electro-Cardiographic Apparatus, etc.  
 Deyrolle et Fils, Models of Human and Comparative Anatomy, and other Anatomical Preparations.  
 Dr. Th. Edelmann, Electrical Measuring Instruments, Einthoven Galvanometers, Electro-Cardiographic Apparatus.  
 Ferdinand Ernecke, General Physical Apparatus.  
 R. Fuess, Petrographical Microscopes, Goniometers, Refractometers, Meteorological Apparatus, Precision Thermometers, etc.  
 Robert Goetze, Apparatus for Physical Chemistry and Precision Thermometers.  
 Greiner & Friedrichs, Fine graduated and lamp-blown Chemical Glassware.  
 Dr. G. Grübler & Co., Stains for Biological Work.  
 Emil Gundelach, Fine Chemical Glassware, Vacuum Tubes, etc.  
 Hartmann & Braun, Electrical Measuring Instruments.  
 Chas. Hearson & Co., Ltd., Bacteriological Incubators and Paraffine Baths.  
 Adam Hilger, Ltd., Wavelength Spectrometers and Spectrographs, Refractometers, Interferometers Goniometers, Spectrophotometers and Diffraction Gratings.  
 R. Jung, Physiological Apparatus, Microtomes, etc.  
 C. A. F. Kahlbaum, High Grade Chemicals and Reagents.  
 Max Kohl, Physical Apparatus. Comprehensive catalogue of 882 pp.  
 Fritz Köhler, Apparatus for Physical, Electro- and Photo-Chemistry.  
 Königliche Porzellan-Manufaktur, Porcelain Ware for laboratory and manufacturing purposes.  
 Dr. F. Krantz, Crystal Models and Mineralogical Preparations and Collections.  
 A. Krüss, Spectroscopes, Spectrometers, Spectrophotometers, Colorimeters, etc.  
 F. & M. Lautenschlaeger, Bacteriological and General Laboratory Apparatus. A large general catalogue of 743 pages.  
 E. Leybold's Nach., Physical Apparatus, Gaede Vacuum Pump, Gaede Molecular Pump, etc.  
 C. F. Palmer & Co., Physiological Apparatus.  
 Ph. Pellin, Polariscopes, Colorimeters, Spectroscopes, Le Chatelier Metallurgical Microscope, etc.  
 Wilh. Petzold, Physiological Apparatus.  
 Pulsometer Engineering Co., Geryk Vacuum Pump.  
 W. G. Pye & Co., Physical Apparatus.  
 Carl Reichert, Polariscopes, Metallurgical Microscopes, etc.  
 Max Rinck, Physiological Apparatus.  
 Alb. Rueprecht & Sohn, Analytical Balances and Weights.  
 Gebr. Ruhstrat, Laboratory Resistances.  
 F. Sartorius, Analytical Balances, Microtomes, etc.  
 Schmidt & Haensch, Spectroscopes, Spectrometers, Polariscopes, Photometers, Spectrophotometers, Colorimeters, etc.  
 Schott & Gen., Jena Laboratory Glassware.  
 Dr. Siebert & Kuhn, Fine Thermometers.  
 Société Gènevoise, Optical Measuring Instruments, Dividing Engines, Physical Apparatus.  
 Spindler & Hoyer, Apparatus for Physiology and Psychology. Radio-Chemistry, etc.  
 Steeg & Reuter, Mineral Preparations.  
 Tramond, Models of Human and Comparative Anatomy, Osteological Preparations.  
 Otto Wolff, Electrical Measuring Instruments, Designs of the Physikalisch-Technische Reichsanstalt.  
 Carl Zeiss, Microscopes and Optical Measuring Instruments (See Special Announcement page IV).  
 E. Zimmerman, Apparatus for Physiology and Psychology.

A very complete index is to be found on page 558 of the catalogue.

The arrangement of this catalogue is based upon convenience rather than consistency. All systematic plans lead if completely carried out to inconvenient location of certain articles. The general arrangement is alphabetical but in a number of instances the group system has been followed as a more convenient arrangement.

## GROUP ARRANGEMENT

	PAGE		PAGE
Asphalt and Tar Testing	15	Mineralogy, Petrography, Crystallography, Etc.	352
Bacteriological Apparatus	21	Nitrogen Determination	364
Cement Testing	111	Oil Testing	368
Charts	124	Photo-Micrography	337
Crushing, Grinding and Pulverizing	161	Physical Chemistry	388
Dissecting Instruments	181	Physiological and Clinical Apparatus	398
Electro-Chemistry	195	Plant Physiology	416
Gas Analysis	245	Polariscopes and Accessories	424
Haematology	262	Projection Apparatus	439
Measuring Appliances	290	Radio-Chemistry	460
Microscopes and Accessories	304	Spectroscopes and Accessories	492
Microtomes and Accessories	343	Testing of Materials	525
Milk Testing	348	Urine Analysis	543

## CONDENSED INDEX

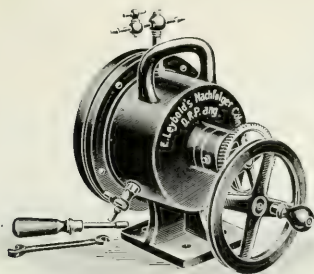
	PAGE		PAGE
Accumulators	66	Gas Generators	254
Air Pumps	1	" Regulators	256
Ammonia Apparatus, Folin	543	Gauges, Vacuum and Pressure	258
Anaerobic Culture Apparatus	8	Geological and Mineralogical Apparatus	352
Asbestos Goods	14	Glass Plates	419
Asphalt and Tar Testing Apparatus	15	" Rod	260
Autoclaves	21	" Tubing	260
Bacteriological Apparatus	21	Graduated	267
Balances	16	Grinding Apparatus	161
Balopticons (Projection Apparatus)	439	Haemacytometers	262
Batteries	66	Haematology, Apparatus for	262
Beakers	68	Hardness Testers	267
Bell Glasses	71	Hearson Incubators	24
Blowers	73	Hot Plates	268
Blowpipes	74	Hydrometers	271
Botanical Supplies	75	Incubators, Bacteriological	21
Bottles	75	" Embryological	29
Brushes	85	Interferometer	471
Burettes	86	Jars	276
" Supports	90	Kjeldahl Apparatus	364
Burners	91	Kymographs	399
Calcium Chloride Cylinders	99	Labels	282
Calorimeters	101	Lamps, Micro	314
Casseroles	110	Lecture Apparatus, Hoffman	283
Cement Testing Apparatus	111	Magnifiers	286
Centrifuges	115	Manometers	289
Charts, all kinds	124	Measuring Appliances	290
Chronograph	139	Metallic Tubing	542
Chronometer	139	Metallographic Apparatus	298
Chronoscopes	139	Meter Sticks	290
Clamps	140	Microscopes and Accessories	304
Colorimeters	144	Micro-Photographic Apparatus	324
Combustion Boats	149	Micrometer Calipers	290
" Furnaces	150	" Microscopes	292
" Train, Vanier	150	Microtomes	343
" Tubes	149	Milk Testing Apparatus	348
Compressors, Gas	151	Mills	161
Condensers	152	Mineralogical Collections	361
" Supports	153	Molecular Weight Determination Apparatus	388
Conductivity Cells	390	Mortars	362
Corks	154	Motors	362
" Borens	154	Muffles	376
Cover Glasses, Micro	334	Musings Jars	420
Crucibles	156	Needles, Dissecting	182
" Tongs	338	" Inoculating	354
Crushing Apparatus	161	" Syringe	518
Crystallization Dishes	177	Nitrogen Determination Apparatus	394
Culture Dishes	170	Oil Testing Apparatus	368
" Flasks	171	Ovens, Drying	378
Cylinders	171	" Embedding	470
Desiccators	175	Petri Dishes	421
Digestion Apparatus, Kjeldahl	364	Petrological Collections	461
Dishes	178	Photometers	382
Dissecting Instruments	181	Photo-Micrographic Apparatus	337
Distillation Flasks	222	Physiological and Clinical Apparatus	398
Distilling Apparatus	186	Pneumatics Jars	412
Drying Ovens	374	Pipettes	425
" Tubes, Calcium Chloride	195	" Supports	415
Electro-Chemistry Apparatus	195	Plant Physiology	416
Electro-Cardiographic Outfits	410	Platinum Ware	420
Electroscopes	460	Pliers	423
Embedding Ovens	412	Polariscopes and Accessories	424
Evaporating Dishes	218	Potash Bulbs	436
Extraction Apparatus	206	Preparation Jars	476
Fermentation Tubes	209	Presses	437
Filters	210	Pressure Gauge	258
Filter Apparatus	218	Projection Apparatus	439
" Flasks	223	Pumps, Air	217
" Paper	213	" Filter	217
" Pumps	217	Pyrometers	449
Flasks	218	Pyrometry, Apparatus	459
Forceps	227	Radio-Chemistry Apparatus	460
" Dissecting	181	Reading Microscope	296
Funnels	228		
Furnaces, Gas and Electric	234		
Gas Analysis Apparatus	245		
		Reagent Bottles	80
		Refractometers	465
		Retorts	474
		Rheostats, for Projection Apparatus	448
		" laboratory work	320
		Rings, Concentric	475
		" for supports	475
		Rubber Bulbs	478
		" Stoppers	477
		" Tubing	478
		Rules	290
		Saccharimeters	430
		Saccharometers	345
		Sand Baths	480
		Scalpels, Dissecting	182
		Scoops	481
		Shaking Apparatus	483
		Sieves	486
		Silica Tubing	489
		Slides, Micro	334
		Slide Rules	480
		Sodium Press	438
		Spatulas	490
		Specimen Jars	276
		Spectrographs	492
		Spectrometers	492
		Spectrophotometers	492
		Spectroscopes and Accessories	492
		Spoons	500
		Staining Dishes	507
		" Jars	507
		Stereopticons (Projection Apparatus)	439
		Sterilizers	37
		Stills	486
		Stirring Apparatus	509
		Stopcocks	510
		Stopwatches	513
		Storage Batteries	66
		Supports	513
		Syringes	516
		Test Glasses	520
		Testing of Materials, Apparatus for	480
		(Paper, Leather, Yarn, Textile)	525
		Test Tubes	320
		" Supports	522
		Thermometers	526
		Thermo-regulators	536
		Tongs	538
		Trays	538
		Triangles	539
		Tripods	541
		Tubing, Aluminum	7
		" Glass	260
		" Rubber	478
		" Silica	489
		Urea Apparatus, Folin	543
		Urine Analysis Apparatus	343
		Vacuum Distilling Apparatus	390
		" Drying Ovens	379
		" Flasks, Dewar	224
		" Gauge	258
		" Pump	445
		Vials	475
		Viscosimeters, Asphalt	15
		" Blood	267
		" Oil	370
		" Rubber	478
		Wash Bottles	219
		Watch Glasses	547
		Water Baths	548
		Water Stills	186
		Weights, Analytical	62
		Wire	554
		" Baskets	522
		" Gauge	554
		" Gauge	554
		" Platinum	420





20000.	Absorption Blocks, of paper purified with acids and used in calorimetric determinations to absorb difficult combustible liquids.			
	Height, mm.	15	13	16
	Diameter, mm.	7	10	14
	Per 100, net.	1.10	1.10	1.10
20004.	Acetometer, Otto. For determining the percentage of acetic acid in vinegar, on wooden base.			75
20008.	Acid Basins, of porcelain.			
	Diameter, mm.	115	130	155
	Each.	1.10	1.25	1.50
20012.	Acid Pitchers, of stoneware.			
	Capacity, cc.	1000	2000	4000
	Each.	.30	.35	.60
20016.	Acid Pump, for drawing acids, ammonia, etc., from carboys and large containers. A foot power blower or other form of blast apparatus is necessary for use in connection with it.			5.00
20020.	Acid Pump, with force pump attached. Suitable for bottles and carboys with inside diameter of mouth $1\frac{1}{4}$ to $2\frac{3}{8}$ inches.			5.00
20024.	Adapters, curved; light wall, lamp blown; for connecting retorts with receivers.			
	Length, mm.	130	150	200
	Diameter at large end, mm.	22	30	40
	Each.	.20	.30	.35
20028.	Adapters, straight; light wall, lamp blown.			
	Length, mm.	130	150	200
	Diameter at large end, mm.	22	30	40
	Each.	.20	.30	.35
20032.	Air Pump, Vacuum and Pressure, of brass, nickel plated. Mounted on oak base, with chamber 16 inches long by $2\frac{1}{2}$ inches in diameter. With two valves and two nipples for inlet and outlet of air.			8.00
20036.	Air Pump, "Geryk" No. 0, fast running type, with new patented improvements, with $1\frac{1}{2}$ inch cylinder by 5 inch stroke, with 7 inch plate and vacuum gauge; giving a vacuum to .3 mm less than perfect vacuum as measured by the MacLeod Gauge. All the ordinary phenomena can be produced, such as the freezing of water by evaporation, and other school work.			
	Duty Free.	30.00	Duty Paid.	36.00





No. 20052

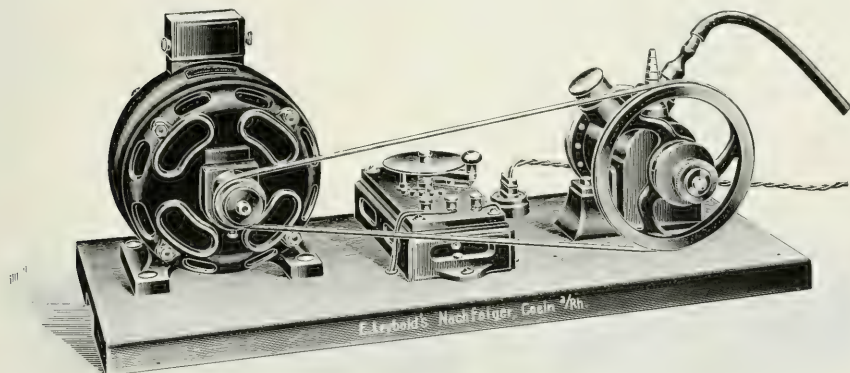


No. 20052

20052. **Air Pump, Gaede High Vacuum.** Consists of an iron chamber half filled with mercury in which a porcelain drum rotates. This pump will exhaust a 6 liter flask after it has been brought down to a vacuum of 10 mm by preliminary exhaust (by means of a filter pump or preferably with Gaede's Rotary Pump No. 20056) to .004 mm in 5 minutes, to .0001 mm in 10 minutes and to .00001 mm in 15 minutes. See *Gaede, Physikalisches Zeitschrift, 1907, VIII, p. 852*. Complete with new patented valve drum and glass connection, but without mercury.

Duty Free..... 120.00

Duty Paid..... 160.00



No. 20060

20056. **Air Pump, Gaede Rotary.** Particularly recommended for use as an auxiliary pump in creating the preliminary vacuum necessary with the Gaede High Vacuum Pump. This pump works dry by means of a valve placed eccentrically in a metallic case. This pump is equally suitable for the production of blast as well as vacuum and on this account has wide application in laboratory work. It will evacuate a 6 liter flask from 1 atmosphere to 3 mm in 1 minute, to .04 mm in 2 minutes, to .15 mm in 3 minutes, to .035 mm in 8 minutes, to .012 mm in 10 minutes and to .006 mm in 15 minutes. As a pressure pump it will give a pressure of 1 atmosphere above the pressure of the atmosphere in which it is operated. For hand driving.

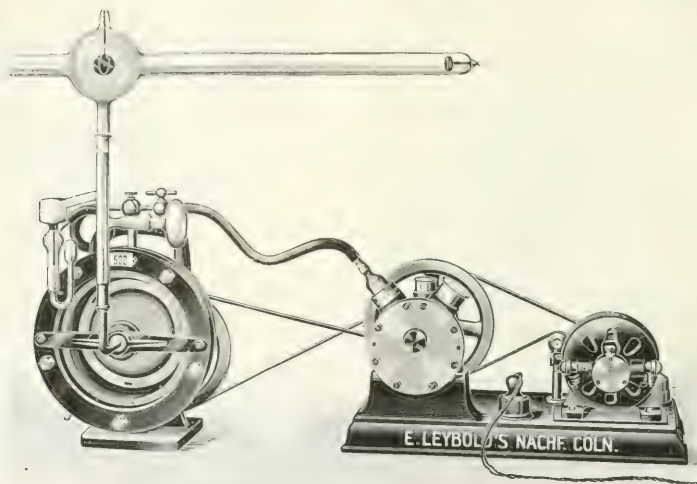
Duty Free..... 186.00

Duty Paid..... 248.00

20060. **Air Pump, Gaede Rotary, with Electric Motor.** Same as 20056 but mounted on base board with electric motor of  $\frac{1}{4}$  h. p. and starting rheostat. Motor arranged for continuous operation. Voltage must be specified in ordering.

Current.....	Direct	Alternating
Duty Free.....	195.00	210.00
Duty Paid.....	260.00	280.00

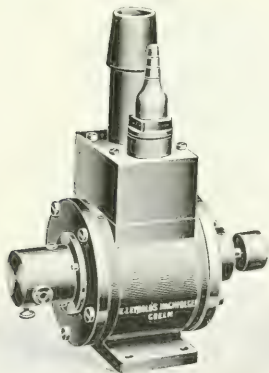




No. 20064

20064. **Air Pump, Combination Outfit**, consisting of Gaede High Vacuum and Gaede Rotary Pumps, the latter mounted on same base with electric motor. By means of belt connection the pumps are operated simultaneously by the same motor. Voltage must be specified in ordering. Motor supplied with this outfit is not intended for continuous operation.

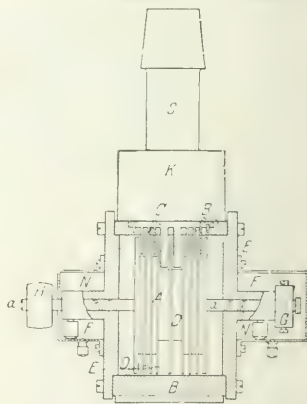
	Direct	Alternating
Duty Free.....	300.00	330.00
Duty Paid.....	400.00	440.00



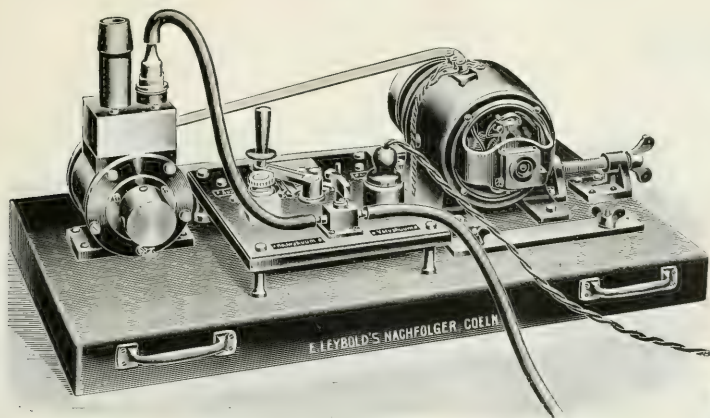
No. 20068

20068. **Air Pump, Gaede Molecular**. A new high vacuum pump which removes all vapors as well as gases. Will exhaust a 6 liter flask starting with a pressure of 10 mm and using the Gaede Rotary Pump as an auxiliary, to .0003 mm in 2 minutes, to .00001 mm in 3 minutes and to .000002 mm in 4 minutes. In other words, this pump will exhaust to the same degree of vacuum in 3 minutes that the Gaede High Vacuum Pump reaches in 15 minutes. The Molecular Pump is built on an entirely new plan, being without piston of any kind and the communication between the receiver and the primary vacuum through the grooves and channels of the pump is at no time closed. The movement of the rotor acts on the movement of the gas molecules in the grooves of the rotor or the casing and produces a region containing fewer molecules, i.e., a vacuum, at the suction nozzle of the pump. This pump requires an electric motor with a speed of 3000 r. p. m. and a pulley 135 mm in diameter to give the required speed, i.e., 8000 r.p.m. Pump only, without motor.

Duty Free.....	198.00	Duty Paid.....	264.00
----------------	--------	----------------	--------



No. 20068



No. 20072

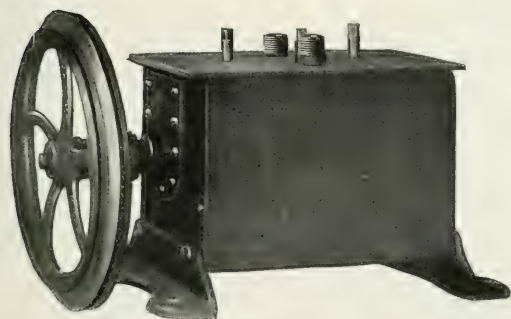


No. 20076

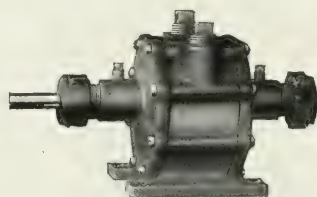
20072. Air Pump, Gaede Molecular with Electric Motor. Same as 20068 but with electric motor and starting rheostat mounted on same base with pump. Voltage must be specified in ordering.
- | Current.....   | Direct | Alternating |
|----------------|--------|-------------|
| Duty Free..... | 300.00 | 330.00      |
| Duty Paid..... | 400.00 | 440.00      |

Note.—The Gaede Molecular Pump should always be backed by another pump which will exhaust into the atmosphere in order to secure maximum effect. In practical work in the manufacture of Roentgen tubes the Gaede pump is frequently backed by such a pump as the McNeill Rotary, which is in turn backed by a piston pump such as the Geryk, such a series being very much more efficient and rapid when so arranged.

20076. MacLeod's Vacuum Gauge for use with Gaede and other apparatus.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 24.00 | Duty Paid..... | 35.20 |
|----------------|-------|----------------|-------|



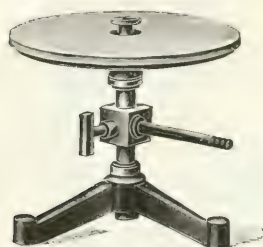
No. 20080



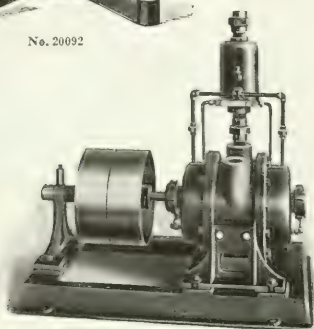
No. 20082

20080. Air Pump, Crowell Rotary Type O-D, will exhaust to a vacuum of from 29 to 30 inches of mercury and can be used either totally immersed in oil in the oil box or without the oil box as shown. The capacity of this pump is 2 cubic feet of free air per minute. The inlet and outlet tubes are tapped for  $\frac{1}{2}$ -inch pipe size and about  $\frac{1}{4}$  h. p. is required for operation; weight with the oil box 50 lbs., without oil box 20 lbs. As used in many college laboratories and in the Nutrition Laboratory of the Carnegie Institution of Washington. Can be used for blast as well as suction. Complete with oil box.....
- |       |
|-------|
| 45.00 |
|-------|
20082. Air Pump, Crowell Rotary Type O-D, as above, but without oil box.....
- |       |
|-------|
| 35.00 |
|-------|

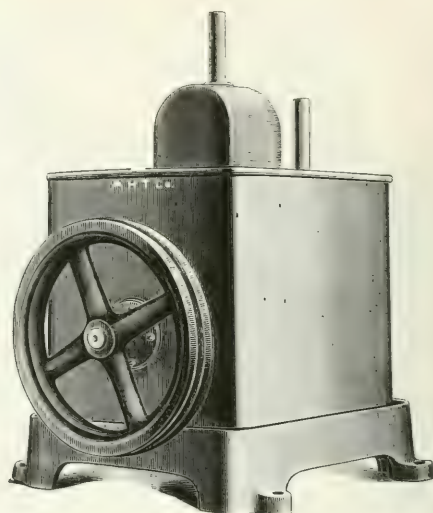




No. 20092



No. 20084



No. 20088

- 20084. Air Pump and Compressor, Crowell Rotary.** Exhausts under ordinary conditions of atmosphere to a vacuum of 29 or 30 inches of mercury. Can be used for pressure or blast up to 25 lbs. to the square inch. There are no valves, springs, gears or unbalanced parts and the direction of rotation is not alternated when changed from use as a compressor to a vacuum pump. Very satisfactory for supplying suction throughout a laboratory for filtrations, etc., or air pressure for blast lamps. For illustration of receiver, see page 73. In ordering please state whether receiver is to be included

SIZE NUMBER	CUBIC INCHES PER REVOLU- TION	CUBIC FEET PER MINUTE AT MAXIMUM SPEED	MAXIMUM SIZED REVOLUTIONS PER MINUTE	APPROXIMATE P. AT 15 LBS. PRESSURE OF 29 INCHES OF VACUUM	PULLERS TIGHT AND LOOSE, INCHES	APPROXIMATE NET WEIGHT, POUNDS	PIPE SIZE, INLET AND OUTLET	FLOOR SPACE, INCHES	PRICE OF PUMP	PRICE OF RE- CEIVER WITH BELL VALVE
1-D	15	4.3	500	$\frac{1}{2}$	6 x 2	70	$\frac{1}{2}$ in	13 x 18	\$40.00	\$8.00
2-D	40	9.12	400	1	8 x 4	115	$\frac{1}{2}$ "	14 x 22	60.00	8.00
3-D	100	17.0	300	$\frac{1}{2}$	12 x 4	250	1 "	19 x 34	90.00	10.00
4-D	280	40.5	250	4	14 x 4	425	$\frac{1}{2}$ "	23 x 38	150.00	10.00
5-D	400	46.0	200	5	18 x 6	580	$\frac{1}{2}$ "	26 x 44	170.00	18.00
6-D	600	69.4	200	$6\frac{1}{2}$	18 x 8	725	1 "	26 x 55	225.00	18.00

- 20088. Air Pump, McNeill Rotary, for High Vacuum.** When properly backed by a pump exhausting into the atmosphere produces a vacuum of .0003 mm and under favorable circumstances will do even better. This pump is widely used in the manufacture of tungsten and other electric lamps and, as it will not exhaust directly into the atmosphere, must be backed by a pump producing a vacuum of at least 1 mm of mercury. In lamp factories a Geryk pump is frequently used for this purpose. The McNeill pump is also used in the manufacture of Roentgen tubes, etc., as an auxiliary to the Gaede Molecular Pump, in which combination it must also be backed by a pump exhausting into the atmosphere

**20090. Special Oil, per gallon.** 100.00

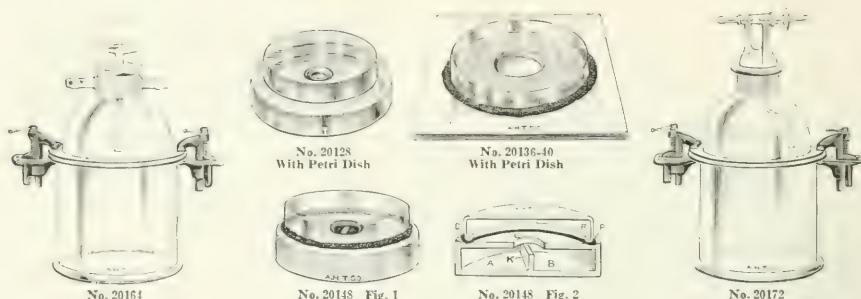
**Note**—Five gallons of the special Oil should be purchased with each Pump. 1.00

- 20092. Air Pump Plates, on tripod base, with heavy plate glass top and two-way stopcock.** Without bell jar. For Bell Jars suitable for use with these plates see No. 21920.

Diameter, mm.	200	250	300
Each.....	10.00	12.00	15.00



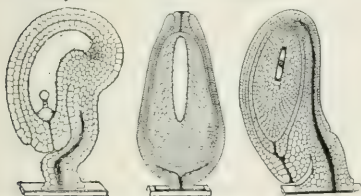




20128. **Anaerobic Culture Apparatus, Küster**, consisting of a glass absorption capsule, 120 mm in diameter by 15 mm high, entirely closed over with the exception of a small hole in the top. Absorbent material such as pyrogallie acid, etc., is placed in the dish to a depth of about 5 mm. The Petri dish containing the culture is then placed over the opening in an inverted position and sealed down with plasticine. When the usual 100 mm Petri dishes are used, about 150 cc of air must be absorbed by the acid. Two parts of sodium hydrosulphite or pyrogallie acid are dissolved in 20 parts of distilled water and poured into the absorption capsule and, just before placing the Petri dish above the capsule, 20 cc. of a 10% solution of potassium hydroxide is added. Absorption takes place very rapidly because of the large absorbing surface and may be hastened by slight shaking. See *Centralblatt f. Bakt. Referate* 57 Bd. No. 14-22, p. 269-271. Absorption capsule only. .40
- Anaerobic Culture Apparatus, Lentz**, consisting of a 125 mm square glass plate and a cellulose absorbent ring. The Petri dish containing the culture is placed in an inverted position over the cellulose ring after same has been soaked in pyrogallie acid, the dish being sealed to the glass plate by means of plasticine. Immediately before using the cellulose ring should be moistened with 1% potassium hydroxide. The rings are 85 mm in diameter, being intended for convenient use with a 100 mm Petri dish. See *Centralblatt f. Bakt.*, 1910, Bd. 53, 1 & 3.
20136. **Cellulose Rings**, as described, per box of 10. .200
20140. **Glass Plates**, 125 mm square. Each. .06
20144. **Plasticine**, in conveniently shaped rods. Per box of 25 rods. 1.25
20148. **Anaerobic Culture Apparatus, McLeod**, consisting of two parts, a porcelain capsule to contain the pyrogallie acid and caustic soda solutions and a special Petri dish which has its free margin turned inwards and upwards. The porcelain dish is a hollow chamber. It is bisected in the lower two-thirds of its depth by a vertical partition and there is a circular aperture in the center of its upper surface. Around the margin of the upper surface is a small groove which is filled with plasticine. In using the apparatus 5 cc to 7 cc of a 15% solution of pyrogallie acid is run into the compartment of the chamber marked A in Fig. 2. This can most easily be done with a large pipette, 5 cc to 7 cc of a 10% solution of caustic potash is then introduced into compartment B. The Petri dish is then pressed down into the plasticine in the groove and the plasticine is pushed up against its outer margin to insure the proper sealing of the chamber. As soon as the access of fresh oxygen from without has thus been cut off, a mixture of the pyrogallie acid and caustic potash solutions is effected by tilting the porcelain dish so that the solutions run over the partition at the point K in Fig. 2 and react with one another. The Petri dish is shown in Fig. 1 ready for use in contact with the plasticine. Any condensation water which may form is retained in the groove R. See *Journal of Pathology and Bacteriology (British)*, Vol. 4, April 1913, p. 454. Complete with both porcelain dish and special Petri dish. 1.25
20152. **Porcelain Capsule**, only. 1.00
20156. **Special Petri Dish**, only. .25
- Note.—For Plasticine see No. 20144.
20160. **Anaerobic Culture Apparatus, Novy**, with removable top permitting the use of Petri dishes. For use by either gas or pyrogallate methods. The two sections have wide ground flanges which, with the rubber bands, form an air-tight connection when held in place by clamps. The lower section is 150 mm high by 140 mm in diameter. Glass parts only, with rubber band but without metal clamps. 4.50
20164. **Anaerobic Culture Apparatus, Novy**, same as No. 20160 but with clamps. 5.00
20168. “ “ “ “ improved form, for the culture of anaerobic bacteria by either vacuum, gas or pyrogallate methods. With stopcock supported horizontally by glass tubes above the regular stopper, relieving the large stopper from pressure and thus permitting the use of the vacuum method. Otherwise identical with No. 20160. Glass parts only, with rubber band but without metal clamps. 5.50
20172. **Anaerobic Culture Apparatus, Novy**, same as No. 20168 but with clamps. 6.00



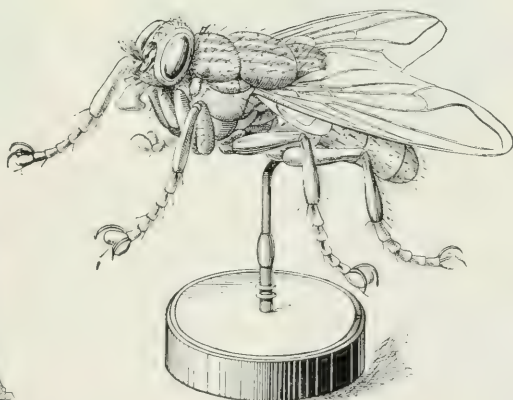
Model of Man with dissectible heart, etc.  
Duty Free .....\$150.00



Fundamental Ovule Formations in Angiosperms  
Duty Free .....\$18.00



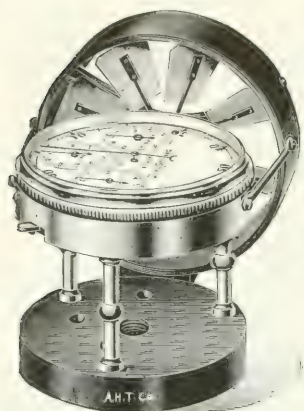
Development of Chick  
Duty Free .....\$37.50



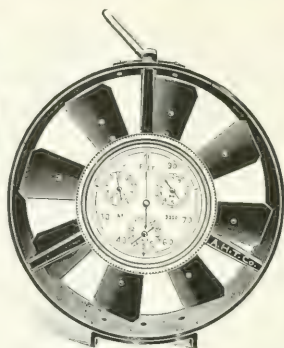
Model of House Fly  
Duty Free .....\$15.00

**ANATOMICAL MODELS**, illustrating Human and Comparative Anatomy, Embryology, Botany, Pathology, Veterinary Science, etc. Our experience in the importation of models and natural history specimens is extensive and we offer prospective customers the original catalogues of the leading European manufacturers in these lines. As practically all of our sales are to institutions entitled to duty free importations, it is not practical to carry the goods in duty paid stock and our experience indicates that customers prefer to order directly from manufacturers' catalogues which are sent upon request.

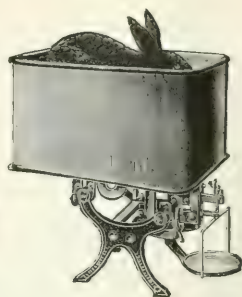




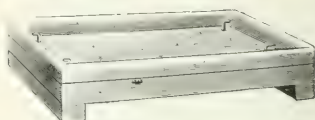
No. 20176



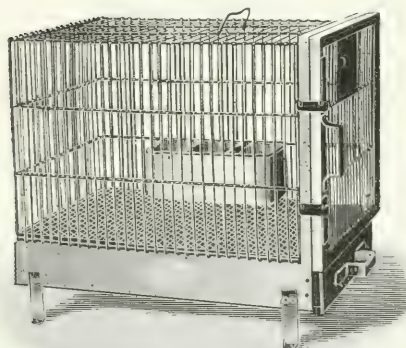
No. 20180



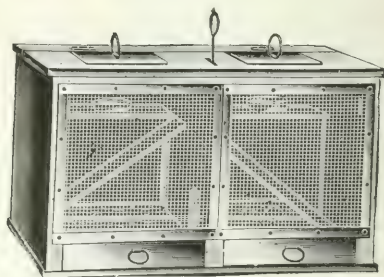
No. 20184



No. 20188

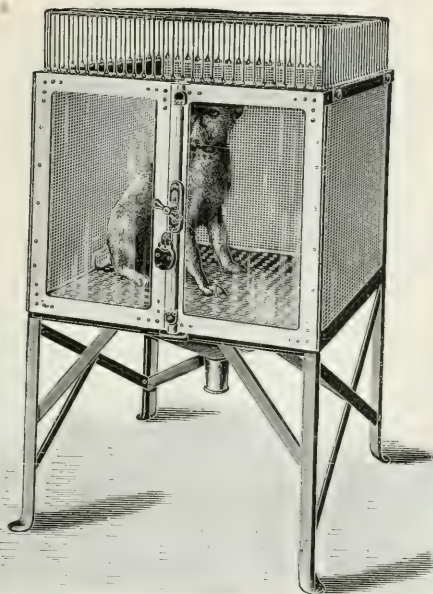


No. 20192

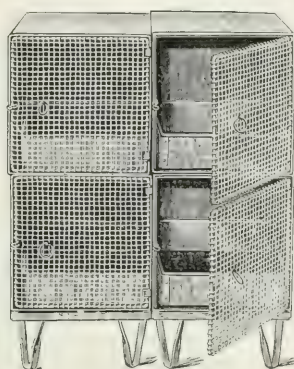


No. 20196

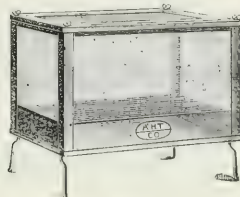
20176.	Anemometer for the measurement of air currents through mines, tunnels, sewers and in the ventilation shafts of hospitals, schools and other public buildings. With four dials reading to 100,000 ft. and with zero setting attachment. Best London make.....	30.00	
20180.	Anemometer, Biram pattern, with four dials reading to 100,000 ft. Best London make.....	28.00	
20184.	Animal Balance, for conveniently weighing animals in the bacteriological laboratory. A decimal balance, very sensitive with removable animal pan and tare weight for same so that balance can be used for other purposes. Capacity 20 kilos. Without weights.....	18.00	
20188.	Animal Board, of wood, with hooks in each corner. Very convenient for animal experiments. Small size is intended for guinea pigs and rats and the larger size for small dogs, cats, etc.		
	Length, mm.....	320	650
	Width, mm.....	200	300
	Each.....	1.50	3.00
20192.	Animal Cage, extra heavy, with removable drawer, feeding trough, etc.		
	Height, mm.....	300	450
	Length, mm.....	400	600
	Width, mm.....	300	400
	Duty Free.....	11.55	15.50
	Duty Paid.....	14.00	18.80
20196.	Animal Cage, Heim. Designed specially as a breeding cage for mice, with two compartments, etc. Of wood with metal fittings, 500 X 300 X 300 mm.		
	Duty Free.....	11.10	
	Duty Paid.....		13.45



No. 2020



No. 20201



No. 20208



No. 20216



No. 20224

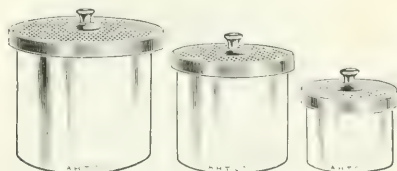


No. 20212

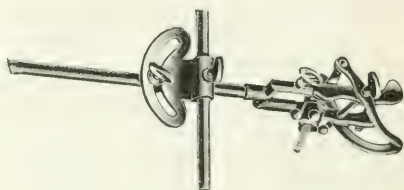


No. 20220

20200. **Animal Cage, Abderhalden.** Designed specially for metabolism experiments, etc. The sides and back are of wire glass, with doors of plate glass. A perforated bottom, easily removable for cleaning, supports the animal over the conical bottom for collection of urine, etc. Heavily made throughout.
- |             |       |       |       |
|-------------|-------|-------|-------|
| Height, mm. | 600   | 700   | 800   |
| Length, mm. | 600   | 700   | 800   |
| Width, mm.  | 600   | 700   | 800   |
| Duty Free.  | 44.55 | 48.85 | 52.80 |
| Duty Paid.  | 54.00 | 59.25 | 64.00 |
20204. **Animal Cage, Phipps Institute Model,** as designed by Dr. Paul A. Lewis. Of heavy galvanized sheet iron. The new feature of these cages is the arrangement for bolting together the units in stacks of two, four, etc., as shown in illustration. Height 14 inches, length 14 inches, width 16 inches. 5.00
20205. **Supports only,** for above, 6 1/2 in. high, each. 1.50
20208. **Animal Cage, Vaughan.** Collapsible for convenience in sterilization or storage, the sides, top and bottom being in separate parts. Height (not including legs) 12 inches, total height 17 inches, length 20 inches, width 15 inches. 8.50
20212. **Animal Holder, for mice.** Made entirely of metal; for inoculating mice; with adjustable clamp for holding the tail of the animal. The conical wire cage is detachable. 1.25
20216. **Animal Holder, Kitasato, for mice;** nickel plated metal plate with spring clamp for fastening the animal by the skin of the neck and a spring clip for holding the tail or leg. The plate may be supported in any position by ball and socket joint. 4.00
20220. **Animal Holder, Voge, for guinea pigs.** Useful for taking temperatures, inoculations, etc. Of zinc.
- |               |     |     |
|---------------|-----|-----|
| Height, mm.   | 180 | 200 |
| Diameter, mm. | 60  | 80  |
| Each.         | .60 | .75 |
20224. **Animal Jar, for mice,** consisting of glass battery jar 5 x 7 inches with wire mesh top and weight. 1.25



No. 20228

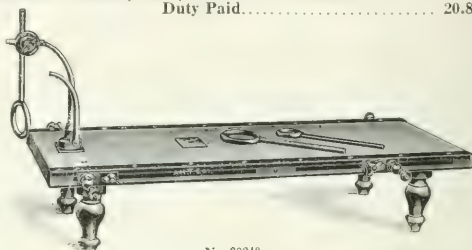


No. 20232

20228. **Animal Jar.** The smaller sizes are intended for mice and the larger sizes for guinea pigs and rabbits. Top is made of heavy galvanized wire with weight. The same jars may be fitted with close-fitting tops of mosquito and flea proof gauze at an additional price. For prices of jars only, see Aquaria No. 20276.
- |                       |      |      |       |
|-----------------------|------|------|-------|
| Height, inches.....   | 7    | 10   | 12    |
| Diameter, inches..... | 8½   | 11   | 16    |
| Each.....             | 2.75 | 4.75 | 11.00 |
20232. **Animal Head Holder, with clamp, large model for dogs, jaws upholstered with leather.**
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 17.25 | Duty Paid..... | 20.80 |
|----------------|-------|----------------|-------|

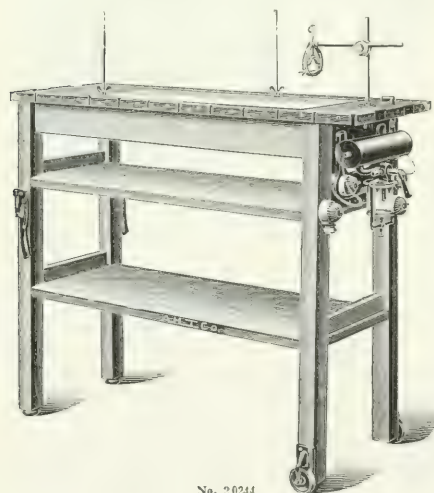


No. 20236



No. 20240

20236. **Animal Holder, Tatin, of metal, for guinea pigs, rats, etc., with two head holders as shown in illustration.**
- |                |      |                |       |
|----------------|------|----------------|-------|
| Duty Free..... | 8.95 | Duty Paid..... | 10.80 |
|----------------|------|----------------|-------|
20240. **Animal Holder, new model, of wood. With adjustable metal fittings on the sides for fastening the legs. This apparatus is suitable for a great variety of work and is sufficiently adjustable to be used for either guinea pigs or dogs. Complete.**
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 24.75 | Duty Paid..... | 30.00 |
|----------------|-------|----------------|-------|



No. 20244

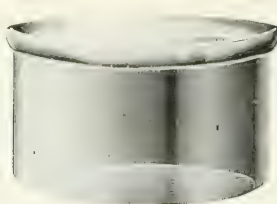
20244. **Animal Table, Brodie, with a top 51 x 18 inches, and 40 inches high. With cleats for the easy attaching of the holding cords. Near the center and flush with the top is a copper hot plate, 30x12 inches, heated by two electric lamps, each having its own independent switch. With two up-right rods working in slots. At the end is attached Dr. Brodie's anaesthetic bottle and air warmer (see No. 43048), with a bent tube projecting through the table to supply air to the animal. Table is complete with animal holder, four control switches, main switch and plug. Voltage must be specified in ordering.**
- |                |       |
|----------------|-------|
| Duty Free..... | 70.00 |
| Duty Paid..... | 85.00 |







No. 20276



No. 20280



No. 20284



No. 20288



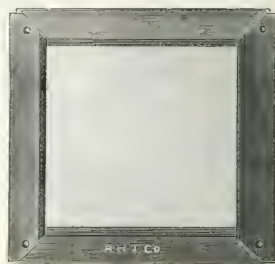
No. 20304



No. 20316

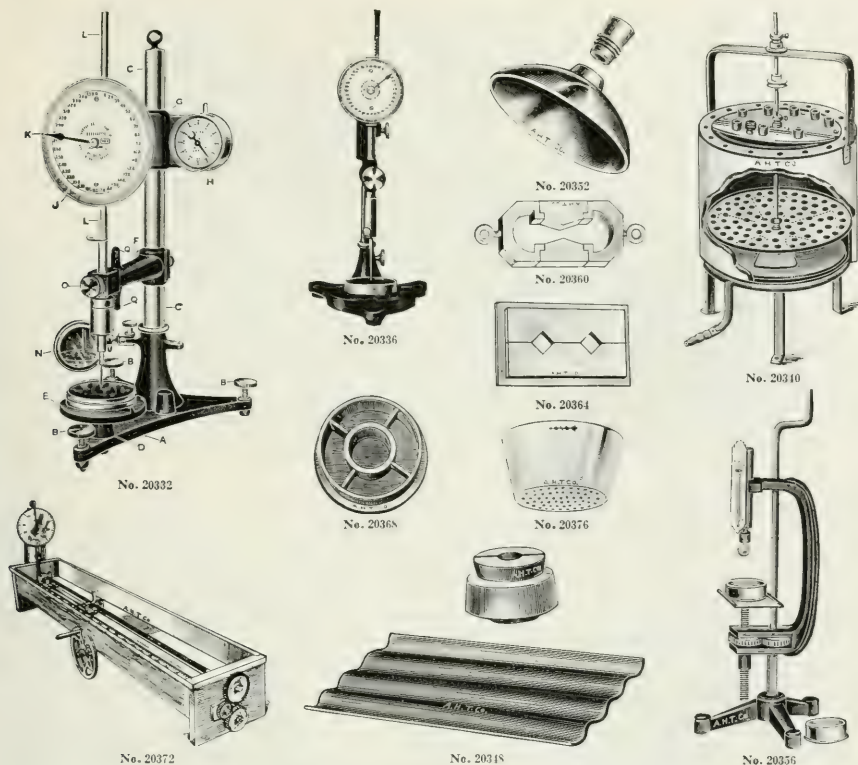


No. 20320



No. 20324

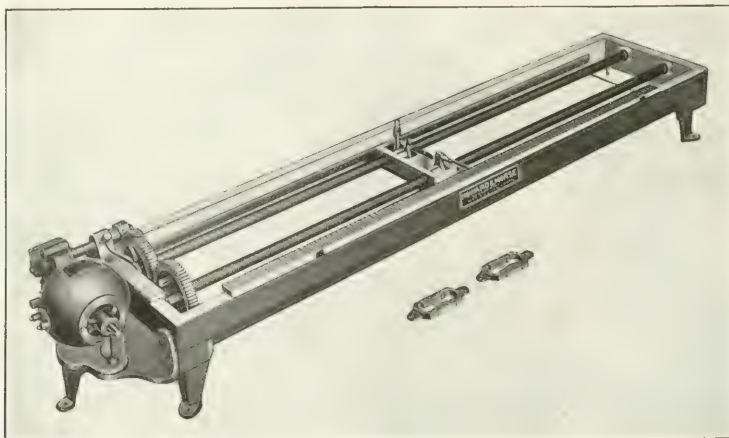
20284.	Arsenic Apparatus, Fresenius, for the detection of arsenic, without support.....	1.00
20288.	“ Tubes, of Bohemian glass	
	Style.....	A B C D
	Each.....	.04 .04 .04 .04
20292.	Arsenic Tubes, Transparent Silica, 3 inches long by $\frac{1}{16}$ inch outside diameter with bulb $\frac{1}{8}$ inch diameter.....	.25
20296.	Asbestos Aprons, made of pure asbestos, canvas lined, complete with strap and buckle fasteners. State size in ordering. A medium size is sent unless otherwise specified.....	7.50
20300.	Asbestos Board, in mill size sheets, 42 x 48 inches. The board is carried in stock in the following thicknesses for which approximate weights are given. On small orders, particularly when shipped alone, necessary crating is charged extra at cost because of the small value of the article itself.	
	Thickness, inches.....	$\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{3}{4}$ $1$ $1\frac{1}{4}$ $1\frac{1}{2}$
	Weight, lbs.....	2 4 7 10 13 18 24 35
	Per lb.....	.10 .10 .10 .10 .10 .10 .10 .10
20304.	Asbestos Board, in squares, for use under beakers, dishes, etc.	
	Thickness, inches.....	$\frac{1}{16}$ $\frac{1}{8}$ $\frac{1}{4}$
	Size, inches.....	4 5 6
	Each.....	.04 .05 .06
20308.	Asbestos Cement, ready for use. Per 5 lb. can.....	.50
20312.	Asbestos Cord, with strong, hard-twisted strands; convenient in the laboratory for supporting retorts, crucibles, etc., in contact with fire or heat; sizes $\frac{1}{16}$ th to $\frac{1}{4}$ th inch diameter, in $\frac{1}{4}$ lb. balls. Per ball.....	.50
20316.	Asbestos Gloves, with four fingers and thumb, made of asbestos cloth, with either asbestos or leather gauntlet. Per pair.....	4.00
20320.	Asbestos Mat, circular, 8 $\frac{1}{8}$ inches in diameter, so-called “stove mats,” with metal binding and ring for hanging up; very convenient in the laboratory.....	.15
20324.	Asbestos Mats, square, $\frac{1}{8}$ inch thick, neatly bound with metal to prevent fraying at the edges. Very convenient for use on table top and under burners to prevent scorching of wood etc. Special sizes made to order.	
	Size, inches....	8 $\frac{1}{8}$ x 8 $\frac{1}{8}$ 11 x 11 9 x 14 15 x 15 10 x 16 12 x 15 14 x 24 24 x 30
	Each.....	.20 .30 .40 .50 .50 .50 1.20
20328.	Asbestos Paper, of pure, white fiber, 36 inches wide. Cut any length. Per lb.....	.20



# ASPHALT AND TAR TESTING APPARATUS

20332. **Penetrometer, Standard, New York Testing Laboratory Type**, for measuring the depth of penetration of a standard needle into the material to be tested at 77° F. or 25° C. in 5 seconds of time under a 100 gram weight; with standard clock reading in  $\frac{1}{2}$  seconds and dial graduated to  $\frac{1}{10}$  mm. A set of adjustable weights is provided permitting the use of either 50 or 100 gram loads in addition to the standard of 100 grams. See "The Modern Asphalt Pavement"..... 60.00
20336. **Penetrometer, Miniature**, exactly similar to the above but one-half the size and specially designed for engineers' portable use in making comparative tests, without clock..... 25.00
20340. **Drying Oven, New York Testing Laboratory Type**, for uniform temperatures, with fan in bottom and 10 inch ring burner; of copper with asbestos jacket, 20 inches high by 11 inches in diameter 35.00
20344. **Drying Oven**, same as above, but of Russia iron..... 25.00
20348. **Asphalt Flow Plate and Mold**, consisting of 3 plates each with four corrugations or 2 plates each with six corrugations and one mold. Type of plate must be specified in ordering..... 5.00
20352. **Asphalt Viscosimeter, New York Testing Laboratory Type**, consisting of a concave aluminum float with three standardized brass plugs; for testing the consistency or the fluidity of bituminous binders at 90° F..... 7.25
- Note** For testing the viscosity of bituminous compounds such as oils, or of asphaltic material at high temperatures, i. e., about 200° F., the Engler Viscosimeter is mostly used. See Oil Testing Apparatus.
20356. **Adhesion Machine, Kirschbraun-Sargent**, a double scale dynamometer graduated in grams up to 250 grams and in ounces up to 8 ounces. Two sample cups are provided, one for the standard sample and one for the unknown. As used in the Chicago Paving Laboratories..... 20.00
20360. **Briquette Mould for Asphalt**..... 4.00
20364. **Cubical Brass Mould**, with plate for melting point determination,  $\frac{1}{2}$  inch..... 4.50
20368. **Bitumen Holder, Draper model**..... 3.00
20372. **Cementation and Ductility Machine, Kirschbraun**, for determining the relative cementation values of asphalt cements. May also be used for ductility and elongation tests under various conditions of temperature and speed..... 100.00
20376. **Crucible, Royal Berlin Porcelain**, of special shape, with large filtering surface, as used in the determination of soluble bitumen. Height 24 mm, width at top 45 mm, width at bottom 35 mm... .50





No. 20384

20380. **Ductility Machine, Smith**, for hand power; made entirely of metal with box heavily plated and enamel painted, with right and left screws, slip nuts for carriage, etc., for tests up to 100 cm in length. The test is conducted at a standard speed of 5 cm per minute at a temperature of 77° F. **135.00**

20384. **Ductility Machine, Smith**, as above but with directly connected, direct current electric motor. **175.00**

20388. **Ductility Machine, Electric Motor Drive, Chew Patent**, constructed entirely of metal. All exposed parts covered by water are made of brass or bronze. Warping and rusting are entirely prevented. The mechanism is strong, simple, durable and easily operated. The operation is smooth, uniform and accurate and reduces the personal equation of the operator to a minimum. This machine is adapted to testing all types of bituminous material which can be cast in moulds.

**Tank**—The tank or box in which the test specimens are immersed is made of iron heavily lined with white porcelain, which makes it possible to see at all times the finest thread to which the specimen may be pulled. It is of such width that three specimens may be tested simultaneously.

**Moulds**—Moulds for test specimens are of bronze, all parts being accurately machined and fitted. They are of standard dimension with a minimum cross section of one square centimeter. A set of three moulds is furnished with each machine. Additional sets may be procured if desired.

**Carriage**—The carriage is triangular in shape, specially designed to allow the operator freedom of access to the platform and posts which carry the moulds. It is supported on two tracks, one of which is slotted for its entire length and serves as a guide, thus insuring a perfect unidirectional pull free from chatter or vibration. The carriage is operated by a single heavy screw shaft placed close to the side of the box so as not to obstruct the manipulation of test specimens. The carriage may at any time be engaged or disengaged from the screw shaft by means of a small hand lever, which operates a two piece nut, even when the screw shaft is turning.

**Drive**—The screw shaft is operated by heavy bronze gears connected direct to the motor at one end of the tank by a worm drive. Either D.C. or A.C. electric motor is furnished as desired. The former is controlled by a rheostat; the latter is of the variable speed type. The motor is substantially mounted so as to reduce the vibration to a minimum.

**Speed Indicator**—The speed at which the test specimen is pulled apart is accurately indicated in centimeters per minute by the Chew Speed Indicator which is attached to the operating shaft of the motor. This is a simple and unique device which makes it possible to operate and regulate the machine without recourse to any other timing device. It constitutes a novel and particularly desirable addition to the older type of machine. Once adjusted it is always reliable and absolutely prevents the possibility of error due to unknown variations in flow of current during the test. Any such variation is at once detected by the speed indicator and may be instantly corrected by adjusting the rheostat lever so that the speed indicator registers the exact speed desired.

**Operation**—After the test specimen has been brought to the desired temperature and attached to posts on carriage and platform, the carriage is disengaged from the screw shaft. The motor is then started and its speed regulated until the speed indicator registers exactly five centimeters per minute. The carriage is then engaged with the screw shaft while in motion. At the conclusion of the test the carriage is disengaged from the screw shaft and slid back to its original position.

Full directions for making the ductility test are furnished with every machine. When placing order, be sure to state the type of current for which motor should be furnished. Price on application.

20392. **Extractor, New York Testing Laboratory Type**, for analysis of paving mixtures containing broken stone.

The bituminous mixture should be warmed until it can be readily broken apart by hand, without fracturing any of the stony particles; 500 grams of the disintegrated mixture should be packed as tightly as possible in the wire basket and then covered with a disc of cotton or felt of  $\frac{1}{2}$  inch to  $\frac{3}{4}$  inch thickness; 175 to 200 cc of carbon disulphide, carbon tetrachloride, chloroform or benzole is placed in the inside vessel in which the wire basket is suspended. Cool water should be circulated through the inverted cone condenser which is also the cover of the apparatus and not intended to fit tight. A 16 c. p. carbon filament incandescent lamp is the source of heat. A 500 gram sample of the mixture should extract clean with carbon disulphide in about 3 hours. From 200 to 300 grams of asphalt block or Topeka type mixture is a sufficiently large sample for that type of mixture. After extraction, the solvent and matter removed from the sample during the analysis should be burnt to recover any fine mineral particles which may have passed into the extract. These extractors are made entirely of metal. Each, complete, but without incandescent lamp. **30.00**

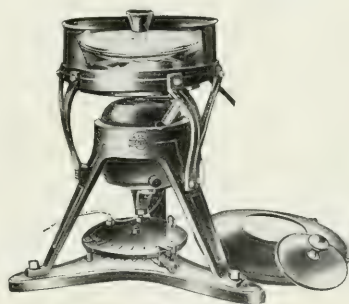


No. 20392

20396. Hydrometer, Sommer's Patent, for determining the specific gravity of asphalt, graduated from 0.85 to 1.3° at 25° C., as recommended by the Committee of the American Society of Civil Engineers. Outfit with brass receptacle and fittings, with instructions for use..... 10.00
20400. Hydrometer, same as No. 20396 but graduated from 0.950 to 1.100 ..... 10.00

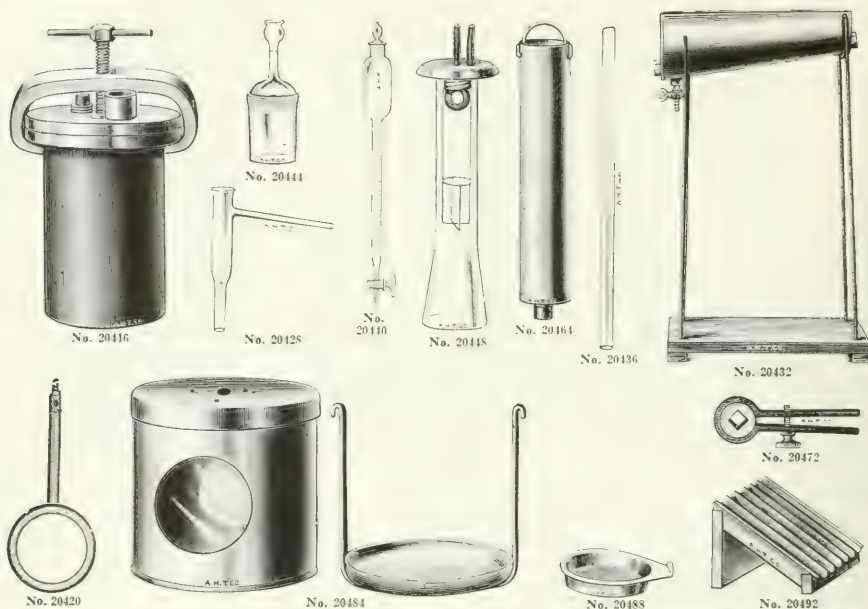


No. 20404



No. 20408

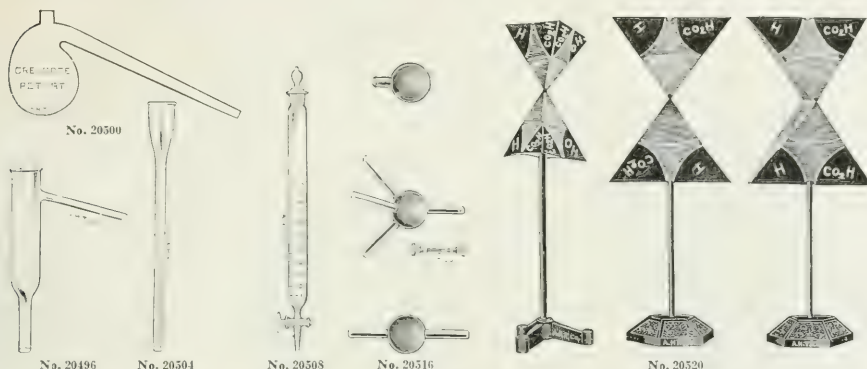
20404. Dulin Rotarex, Large Model with Universal Motor, for samples of 500 or 1000 grams. The advantage of using such a large sample will be readily apparent as it permits running samples which contain a large mineral aggregate as found in asphaltic, concrete or bitulithic pavements. It is also advantageous in securing a considerable amount of bitumen in the pavement which can be used for the penetration test. The machine is directly mounted on top of a universal vertical motor which is entirely enclosed in a cast-iron frame and operates on either 110 volts, 60 cycles, alternating current, or direct current 110 volts. The motor is fitted with a speed control, and may be used on 220 volt circuit with suitable resistance. The bowl in which the sample is placed is of aluminum with a cover of aluminum. The outside bowl or shell is of copper and fitted with a two-piece cover, the smaller of which is removed when adding additional solvent. All of the special features of the smaller type No. 20408 are incorporated in this machine. .... 125.00
20408. Dulin Rotarex, Small Model, for determining the mineral aggregate in bitumen pavements. The asphalt receptacle of aluminum has a removable cover but solvent can be added as required without removing same. The solvent used is non-inflammable. Samples of 10, 25 or 50 grams may be run with accurate results. The motor used may be connected to any 110 volt direct or alternating current (except 25 cycles or less). Time for extraction is 5 minutes, leaving the mineral aggregate perfectly dry so that grades may be determined. .... 60.00



**APPARATUS FOR TESTING COAL TAR AND REFINED TAR, OILS AND PITCHES DERIVED THEREFROM** as adopted in the Standard Methods of the Barrett Manufacturing Company, New York. See *Journal of Industrial and Engineering Chemistry*, April, 1911, March, 1913, and May, 1914. The apparatus, listed below, is only the special apparatus required for these tests. The regular apparatus, such as tripods, burners, clamps, etc., are to be found under their respective headings throughout the catalogue. Complete lists of both the special and regular stock apparatus required for the various tests will be sent upon request.

	<b>Special Apparatus required for Water in Tar Test</b>		
20412.	Copper Still, with steel clamps, inside dimensions 6 x 3½ inches, with six paper gaskets.....	13.25	
20416.	" " same as No. 20412. but larger size, i.e., inside dimensions 7½ x 5 inches.....	17.00	
20420.	Ring Burner, brass, to fit small still No. 20412.....	1.90	
20424.	" " " " " " " " large " " No. 20416.....	3.25	
20428.	Connecting Tube, of glass.....	.25	
20432.	Condenser Trough, of copper, on supports, with wooden base.....	8.00	
20436.	" " Tube, of glass, to fit Condenser Trough No. 20432.....	.20	
20440.	Separatory Funnel, with stopcock, capacity 120 cc.....	3.00	
	<b>Special Apparatus required for Specific Gravity Test</b>		
20444.	Specific Gravity Bottle, Barrett modification of the Hubbard form, 50 cc capacity.....	.90	
	<b>Special Apparatus required for Free Carbon Test</b>		
20448.	Extraction Apparatus, Barrett modification of the Cottle, or Underwriters' form. Complete with flask, cover, coil and basket of German silver wire.....	3.50	
20452.	Glass Flasks, only, for above Extraction Apparatus.....	.40	
20456.	Wire Basket, of German silver, only, for above Extraction Apparatus.....	.50	
20460.	Cover and Coil, of block tin, only, for above Extraction Apparatus.....	2.60	
	<b>Special Apparatus required for Consistency of Refined Tars and Soft Pitch Test</b>		
20464.	Schutte Penetrometer, with one plug.....	3.50	
20468.	Plugs, only, for above Penetrometer, each.....	.25	
	<b>Special Apparatus required for Melting Point of Pitch Test</b>		
20472.	Pitch Mould, consisting of iron clamps with brass block.....	5.00	
20476.	Thermometer, for melting point, etched on stem, 0-80°C. in tths.....	4.50	
20480.	" " " " " " " " 60-140°C. in tths.....	4.50	
	<b>Special Apparatus required for Melting Point of Hard Pitch Test</b>		
20484.	Air Melting Point Oven, of copper, with mica window, removable tray, etc.....	10.75	
	<b>Special Apparatus required for Evaporation Test</b>		
20488.	Evaporating Dish, of pure nickel, with flange and handle.....	1.90	
	<b>Special Apparatus required for Slide Test</b>		
20492.	Slide Box, of copper, with six corrugations.....	7.00	





**Special Apparatus required for Light Oil Test**

20496. Hempel Distilling Tube..... .30

**Special Apparatus required for Standard Creosote Oil Distillation.**

20500. Retort, Resistance Glass, 250 cc capacity. Made to special dimensions and with neck set at special angle otherwise similar to regular retorts which, however, are not suited for this work..... .45

20512. Asbestos Sheet, specially cut to fold into cover for retort..... .50

20514. Thermometer, graduated from 0 to 400° C in 1°. Made specially for this test..... 5.00

20504. Condenser Tube..... .35

**Special Apparatus Required for Additional Creosote Oil Tests**

20508. Separatory Funnel, with ground glass stopper and stopcock, graduated to 100 cc; for heavy oils.. 2.50

20516. Atom Models, Kekule-von Baeyer, consisting of 15 nickel plated binding posts with two clamps, 20 black balls with four connecting posts, 10 red balls with two connecting posts, 30 white balls, 10 yellow balls, 10 green balls, 10 violet balls, and 10 silver colored balls, each with metallic tubulations to slip on posts.

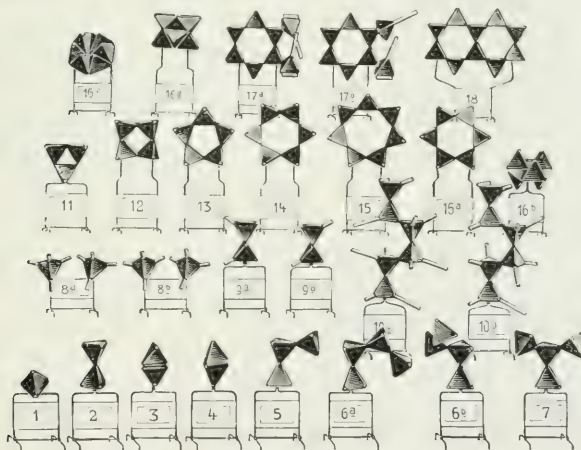
Duty Free..... 13.50

Stock..... 20.00

20520. Atom Models, Eiloart, consisting of six wooden models, six straight pins, six hinged pins, forty japanned tin caps, with formulae, etc.

Duty Free..... 18.00

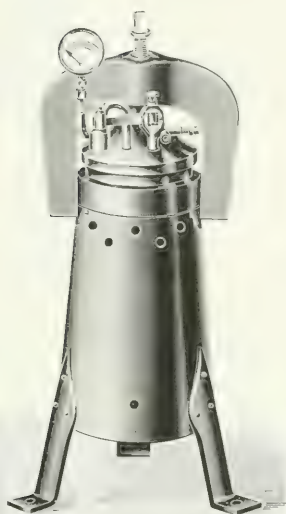
Duty Paid..... 27.00



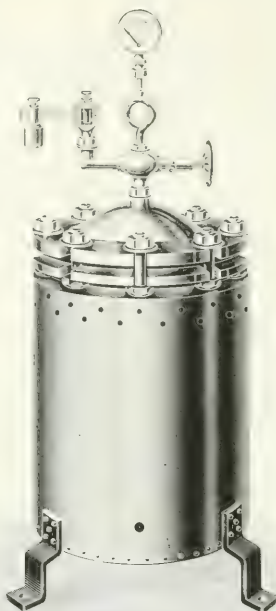
No. 20521

20524. Atom Configuration Models, Wislicenus, for organic chemistry; consisting of 26 models with wire supports; 5 cm size. Duty Free..... 20.00

Single Carbon Atoms for use in the construction of special formulae. Duty Free, per 100. 9.00



No. 20528



No. 20536



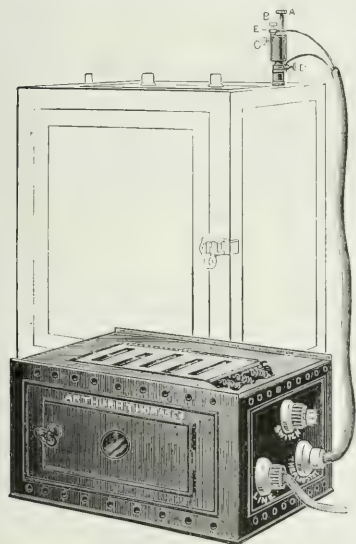
No. 20544

20528. Autoclave, or Digester, for 25 atmospheres pressure. Retort is of hammered copper with lid of phosphor bronze. Pressures given are the steam test pressures, the working pressures being approximately 20% less. The working pressure is indicated on the manometer by means of a red mark. Without burner.
- |                            |           |           |
|----------------------------|-----------|-----------|
| Inside Dimensions, mm..... | 100 x 200 | 125 x 250 |
| Capacity, liters.....      | 1½        | 3         |
| Duty Free.....             | 37.80     | 45.00     |
| Stock.....                 | 50.40     | 60.00     |
20532. Autoclave, same as No. 20528, but for 60 atmospheres pressure.
- |                            |           |           |
|----------------------------|-----------|-----------|
| Inside Dimensions, mm..... | 100 x 200 | 125 x 250 |
| Capacity, liters.....      | 1½        | 3         |
| Duty Free.....             | 55.20     | 71.10     |
| Stock.....                 | 73.60     | 94.80     |
20536. Autoclave, or Digester, for 50 atmospheres pressure, with bolted lid. This construction is recommended for autoclaves of large capacity and for high pressure. Otherwise the construction is identical with No. 20528.
- |                            |           |           |
|----------------------------|-----------|-----------|
| Inside Dimensions, mm..... | 200 x 250 | 225 x 350 |
| Capacity, liters.....      | 7½        | 13        |
| Duty Free.....             | 135.00    | 168.00    |
| Duty Paid.....             | 180.00    | 224.00    |
20540. Autoclave, same as No. 20536 but for 100 atmospheres pressure.
- |                            |           |           |
|----------------------------|-----------|-----------|
| Inside Dimensions, mm..... | 200 x 250 | 225 x 350 |
| Capacity, liters.....      | 7½        | 13        |
| Duty Free.....             | 231.00    | 288.00    |
| Duty Paid.....             | 312.00    | 384.00    |
- Note—The above autoclaves are furnished entirely of cast iron, for operation where ammonia is freed, on special order, at 5% less cost.
20544. Autoclave, or Digester, tested to 12 atmospheres pressure, with inside dimensions of 65 mm in diameter and 160 mm high. With bolted on lid, safety valve, manometer, etc., very convenient where small capacity is desired as it may be supported in an ordinary retort stand ring. This autoclave is also furnished entirely of cast iron on special order.
- |                |       |            |       |
|----------------|-------|------------|-------|
| Duty Free..... | 28.80 | Stock..... | 38.40 |
|----------------|-------|------------|-------|

## BACTERIOLOGICAL, HISTOLOGICAL AND SEROLOGICAL APPARATUS

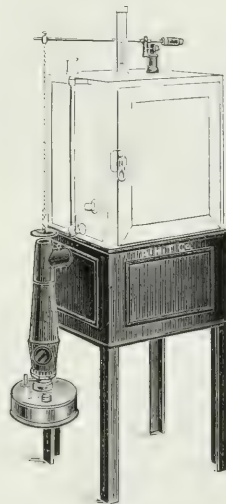
**AMERICAN STANDARD INCUBATORS** are built under our personal direction in the first sheet metal factory in the U. S. to take up (some twenty years ago) the manufacture of sheet metal apparatus for bacteriological work, and they embody twenty years' experience in both the manufacture and selling of bacteriological apparatus. The Incubators are made of heavy polished copper covered with a water-proof, non-conducting material. All are of the latest triple wall construction, which provides space for both warm air and water. The walls of the water jacket are thoroughly reinforced to prevent bulging, due to lateral pressure of the water, a defect very common in low priced utensils. The bottoms are conical in construction to evenly distribute heat, and to evenly heat the water spaces on all sides, by a circulation of hot air, thus giving equal and uniform temperature. The products of combustion and the hot air pass out by a side ventilator on top of the incubator. A glass water gauge with stopcock which shuts off the water from the gauge in case the tube is broken, is provided. A metallic tube through the air jacket connects the thermo-regulator with the burner and all burners furnished with incubators connect with this pipe by means of flexible metallic tubing instead of the rubber tubing previously used. This is an important feature and greatly minimizes the danger from fire. The closed in bases are of sheet-iron properly ventilated and furnished with a mica window for observing the flame. All incubators are furnished with carefully prepared instructions for installing and adjustment.

Any of our American Standard Incubators, whether for gas, oil or electric heating, can be used as paraffine embedding ovens at temperatures up to 70° C. In the cases of oil and electric heating this specification should be given at the time of ordering to insure proper adjustment of regulators.



American Standard Incubator  
with  
Equipment Dd, for Electric Heating

This electric heating and temperature control operates equally well on direct or alternating current. Electric heating units can at any time be removed and incubator operated for gas heating. There are no exposed terminals and apparatus operates directly on the circuit. Before shipment each incubator is tested to maintain a constant temperature. In ordering it is necessary to state voltage and whether for direct or alternating current.



American Standard Incubator  
with  
Equipment Cc, for Oil Heating

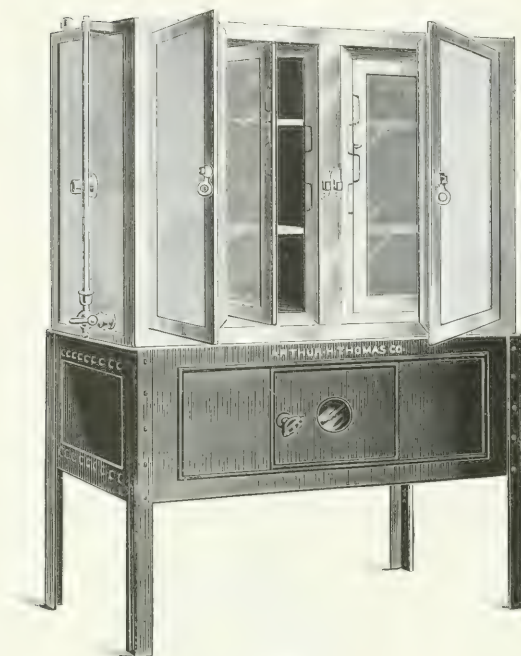
This device for oil heating incubators is entirely new and is much simpler in operation and control than anything heretofore offered. The regulator is on the principle of the Roux metallic which directly operates the damper over the lamp, permitting either the escape or the utilization of the heat. Under proper conditions will regulate to  $\frac{1}{2}^{\circ}$ .

**EQUIPMENT Aa** consists of Roux bimetallic thermo-regulator, incubator thermometer, and Koch safety burner with flexible metallic tubing attached.

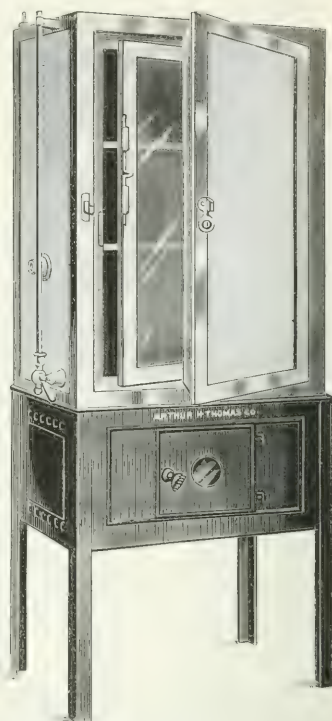
**EQUIPMENT Cc** consists of oil lamp heater, Roux bimetallic thermo-regulator and incubator thermometer.

**EQUIPMENT Dd** consists of incubator thermometer, and electric heating units with electric thermo-regulator.



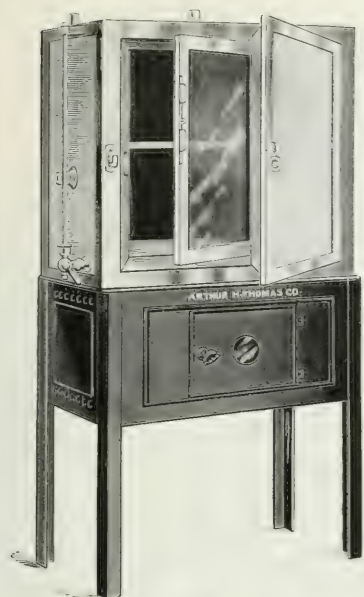


No. 20600

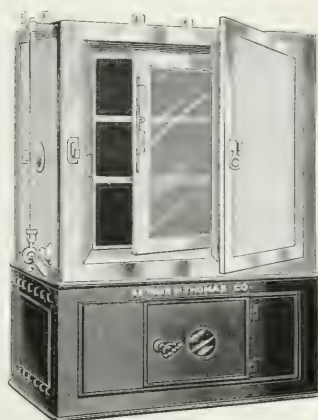


No. 20632

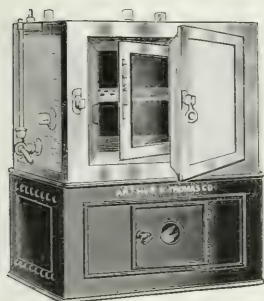
20600.	Incubator, American Standard, Board of Health Type, inside dimensions 25x30x18 inches. With double doors and mounted on base 32 inches high with enclosed compartment for burner. Without burner, thermo-regulator or thermometer.....	183.00
20604.	Incubator, American Standard, as above, with Equipment Aa for gas heating.....	200.00
20608.	" " " " " " " " Cc for oil heating.....	212.00
20612.	" " " " " " " " Dd for electric heating.....	257.00
20616.	Incubator, American Standard, Board of Health Type, inside dimensions 18x30x14 inches. With double doors and mounted on base 32 inches high with enclosed compartment for burner. Without burner, thermo-regulator or thermometer.....	157.50
20620.	Incubator, American Standard, as above, with Equipment Aa for gas heating.....	174.50
20624.	" " " " " " " " Cc for oil heating.....	185.00
20628.	" " " " " " " " Dd for electric heating.....	227.00
20632.	Incubator, American Standard, College Type, inside dimensions 28x18x14 inches. With single door, and mounted on base 27 inches high, with enclosed compartment for burner. Without burner, thermo-regulator or thermometer.....	138.00
20636.	Incubator, American Standard, as above, with Equipment Aa for gas heating.....	155.00
20640.	" " " " " " " " Cc for oil heating.....	165.50
20644.	" " " " " " " " Dd for electric heating.....	200.00
20648.	Incubator, American Standard, College Type, inside dimensions 18x18x12 inches. With single door and mounted on base 31 inches high with enclosed compartment for burner. Without burner, thermo-regulator or thermometer.....	105.00
20652.	Incubator, American Standard, as above, with Equipment Aa for gas heating.....	122.00
20656.	" " " " " " " " Cc for oil heating.....	131.00
20660.	" " " " " " " " Dd for electric heating.....	163.25
20664.	Incubator, American Standard, Hospital Type, single door, on 11 inch enclosed base. Inside dimensions 20 x 18 x 10 inches. Without burner, thermo-regulator or thermometer.....	90.00
20668.	Incubator, American Standard, same as above, but with Equipment Aa.....	107.00
20672.	" " " " " " " " Equipment Cc.....	116.00
20676.	" " " " " " " " Equipment Dd.....	148.25



No. 20648



No. 20661



No. 20696

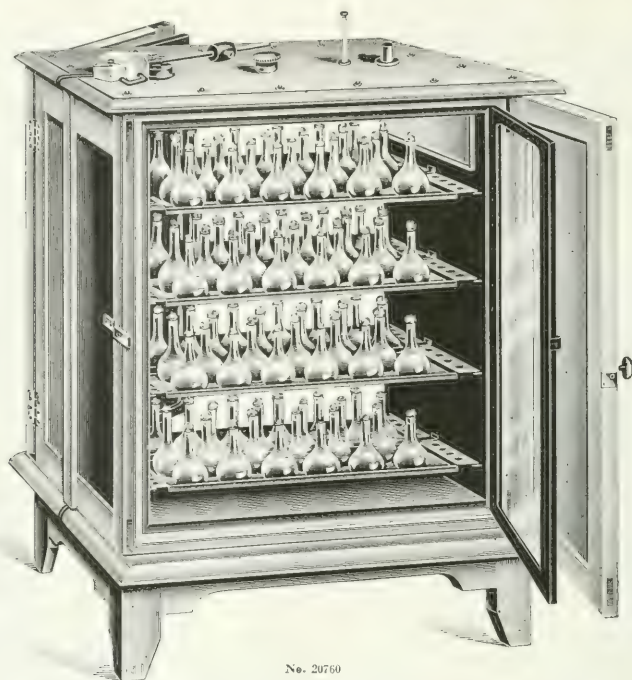


No. 20712



No. 20680

20680.	Incubator, American Standard, Hospital Type, inside dimensions 19 x 12 x 10 inches. Without burner, thermo-regulator or thermometer	78.00
20684.	Incubator, American Standard, same as above, but with Equipment Aa	93.50
20688.	" " " " " " " " Equipment Cc	102.50
20692.	" " " " " " " " Equipment Dd	137.00
20696.	Incubator, American Standard, Hospital Type, inside dimensions 9½ x 12 x 9½ inches. Without burner, thermo-regulator or thermometer	45.00
20700.	Incubator, American Standard, same as above, but with Equipment Aa	60.50
20704.	" " " " " " " " Equipment Cc	69.50
20708.	" " " " " " " " Equipment Dd	100.25
20712.	Incubator, Physician's Laboratory, double wall. Inside dimensions 10 x 8 x 8 inches. Specially recommended as a satisfactory paraffine oven as well as for bacteriological work. Without burner, thermo-regulator or thermometer	36.00
20716.	Incubator, same as above, but with Equipment Aa	51.50
20720.	Incubator, same as above, but slightly wider, i. e., inside dimensions 12 x 10 x 10 inches. Especially recommended where a low priced, servicable incubator or paraffin oven is required. Without burner, thermo-regulator or thermometer	43.50
20724.	Incubator, same as above, but with Equipment Aa	59.00



No. 20760

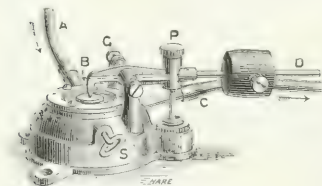
**HEARSON INCUBATORS.** These incubators consist of a water-jacketed chamber made of stout copper surrounded by insulating material and the whole encased in wood. They are provided with an inner door of glass and an outer one of panelled wood. In the two larger sizes the doors are double. The distinctive feature is the temperature control by means of a **metallic, hermetically sealed capsule** which contains a few drops of liquid having a boiling point at or near the temperature which it is desired to maintain in the heating chamber. The regulation is established by the expansion of this capsule owing to the boiling of its contents which provides the motive force for operating the control lever. This expansion takes place only at the predetermined temperature. The lever will only be acted upon when the critical temperature is reached, no sensible effect being produced at even one degree below that at which the capsule is desired to act. A sliding weight compensates for slight barometric variations and, in addition, controls within certain limits the boiling point of the capsule so that a range of  $8^{\circ}\text{C}$ . is possible with any particular capsule and the total range by means of these capsules is from  $16^{\circ}\text{C}$ . to  $175^{\circ}\text{C}$ .

This system of temperature control applies equally well to gas, oil or electric heating and also to the control of the low temperature incubator for gelatine cultures operating at  $20^{\circ}\text{C}$ .

These incubators, although comparatively new in the United States, have been used for a number of years with great success in leading European bacteriological laboratories, particularly those of the Pasteur Institute in Paris. Instructions for operating are furnished with each incubator.

**HEARSON INCUBATORS FOR GAS HEATING.** The Excelsior Gas Valve used in the control of incubators heated by gas and operates as follows:—

A is the inlet for gas; C the outlet to burner; BD a lever pivoted to standards at G and acted upon by the capsule, through the needle which enters the socket below the screw P. The construction of the acting portion of this valve is such that whenever the end B of the lever BD presses on the disc below the end B, the main supply of gas is entirely cut off. At such times, however, a very small quantity of gas passes from A to C, through an aperture inside the valve, the size of which aperture can be adjusted by the screw needle S, hence the gas flame below the incubator is never extinguished.

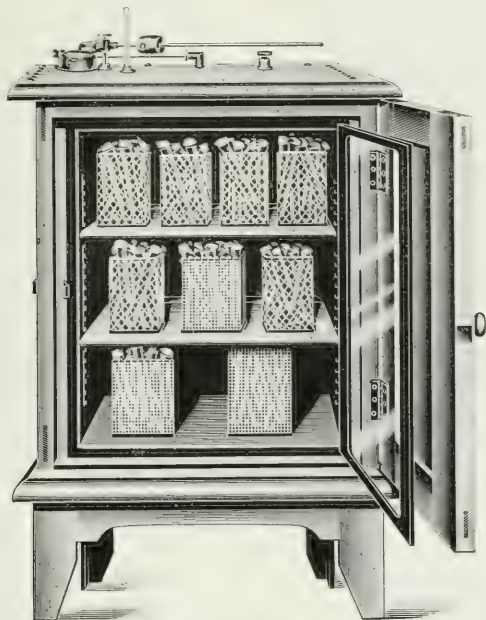


The expansion of the capsule, owing to the boiling of its contents, provides the motive force for acting upon the lever BD.



Changes in the atmospheric pressure, tend to make the temperature fluctuate about 1° F. on either side of the normal, if observations be taken extending over considerable intervals of time. To compensate for these variations, a sliding weight runs on the lever-rod **D**. It also retards within certain limits, the boiling point of the capsule, and thus adjusts the temperature at which the capsule shall expand several degrees above that at which (with the weight to the left) it first commenced to act.

In actual practice it is found that the temperature can be maintained within half a degree without re-adjustment of any part, for months together, and this, too, in spite of great changes of gas pressure, and of air temperature in the room in which the apparatus is working.



No. 20740

**Hearson Incubators for Gas Heating**, with capsule adjusted to 37½° C. unless otherwise ordered, with thermometer, suitable burner with two chimneys, 4 ft. of flexible metallic tubing, etc.

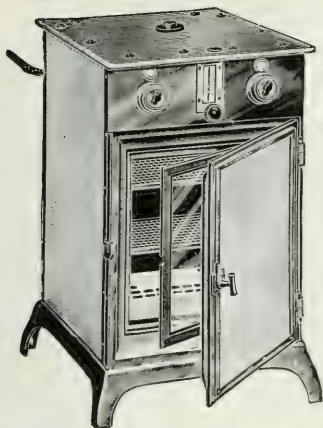
		Inside Measurements	Duty Free	Duty Paid
20728.	Incubator for Gas Heating with one shelf.....	6 x 6 x 7 inches	\$28.95	\$43.45
20732.	" " " " " " " "	9 x 9 x 12 "	36.00	54.00
20736.	" " " " " " " "	12 x 12 x 14 "	45.00	67.50
20740.	" " " " " " two shelves.....	15 x 15 x 18 "	65.55	98.35
20744.	" " " " " " " "	20 x 20 x 24 "	93.15	139.75
20748.	Incubator for Gas Heating, with three shelves.....	18 x 14 x 35 "	100.80	151.20
20752.	Incubator for Gas Heating with four shelves.....	27½ x 16 x 56 "	192.00	288.00
20756.	Incubator for Gas Heating, with center division of six shelves and with the glass door arranged in four divisions to prevent loss of heat when examining cultures. Specially made for milk cultures.	Inside Measurements 60 x 24 x 60 inches	Duty Free 270.00	Duty Paid 405.00
20760.	Incubator for Gas Heating, specially designed for the Pasteur Institute, Paris, for the cultivation of tuberculin. It is fitted with eight copper trays with holes for the passage of air; with two double doors on each side. Fresh air is admitted by four tubes in the bottom and emitted through a regulating ventilator on the top. A special feature is the equal temperature all over the interior.	Inside Measurements 31 x 27½ x 26 inches	Duty Free 194.25	Duty Paid 291.38

Note—Nos. 20728, 20732, 20736 and 20740 are usually in stock for immediate delivery.

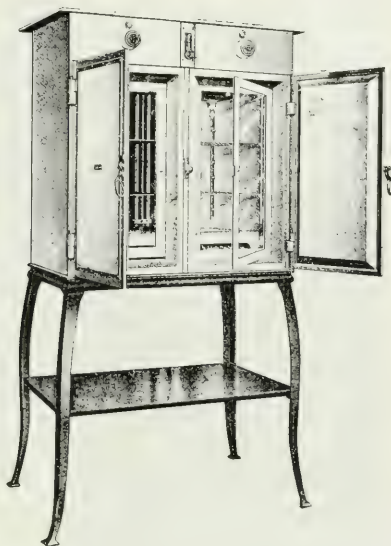
#### HEARSON INCUBATORS FOR OIL HEATING.

The Patent Capsule control lends itself particularly to incubators heated by an oil lamp. The heat from the lamp passes through a flue across the bottom of the incubator and returns again to the lamp by another flue parallel with the first and is then conducted to the open air by a second chimney as shown in illustration. When the degree of heat reached in the chamber is sufficient to expand the capsule the lever will rise and lift the damper from the lamp chimney and after a short period the damper will be found to hang steady in one position and the temperature remain constant. These utensils may be adjusted for higher temperatures for use as paraffine embedding ovens when so ordered.





20812. Size 24



20812. Size 40

**INCUBATORS, FREAS' PATENT ELECTRIC.** These incubators have no water or water jacket and the adjustment is set at the temperature required by simply turning a milled head.

**Construction**—The incubators are constructed of heavy asbestos wood, with cast aluminum door and door frame. This asbestos wood is absolutely fire-proof and possesses unusual insulating qualities. This latter quality and the large thermal capacity of the body of the incubator assist the maintenance of an even temperature throughout the chamber; the air space between the inner and outer walls is filled with insulating material, which results in a very low heat loss, thereby reducing the current consumption to a minimum. The interior is fitted with aluminum racks, allowing the perforated metal shelves to be placed at any desired height. There is provided an inner door of heavy glass, fitted in an aluminum frame cushioned with felt to exclude air, thus permitting inspection of the chamber without opening the door and cooling the incubating chamber. An opening through the top of the incubator to the chamber is provided for a thermometer.

**Regulation**—The regulation device is made entirely of metal, substantially built, so that it is practically impossible for it to get out of order. Its action depends upon the expansion of a metal tube running through the chamber from top to bottom, operating a lever which "makes" and "breaks" a contact, with proper means to prevent arcing. The lever is extended to serve as an indicator, operating up and down the graduated temperature scale on the outside of the incubator. The indicator is moved to the temperature desired by turning the milled-head screw at the bottom of the scale. The regulation is sharp and accurate to a fraction of a degree and remains so indefinitely.

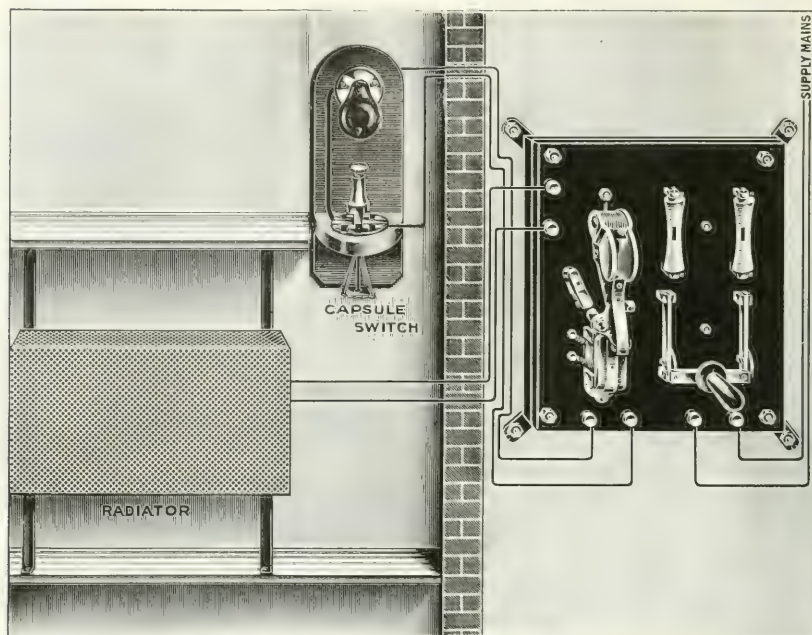
**Temperature Range**—The temperature range of the incubator is from a degree or so above the surrounding air temperature to 60° C.; the regulating device operates just as satisfactorily at lower as at higher temperatures.

**Heating Element**—The heating element consists of a wire wound resistance plate situated at the bottom of the incubator. While there may be no need to remove it, it can be very easily taken out if desired. The plate is wound for 75 watts, about 50 watts being required to maintain a temperature of 37½°.

20812.	Incubators, Freas' Electric.....No.	20	22	24	26	28	32	36	40
	Inside dimensions, inches.....	7x7x10	7x7x10	12x12x12	12x12x12	16x14x16	18x16x20	26x14x22	32x18x24
	Each.....	52.50	57.50	80.00	87.50	140.00	190.00	225.00	270.00

**Note**—Nos. 22, 26, 28, 32, 36 and 40 are provided with switches, one for the current and the other for the electric lamp illuminating the chamber. Nos. 28, 32, 36 and 40 are furnished on high bases, as shown in illustration. Nos. 36 and 40 can be furnished with compartments for students' use. Prices on application.





No. 20816

Arrangement of Hearson Electric Incubating Room, Temperature Control, showing Control Capsule, Automatic Switch and Blow-out

#### Directions for Constructing an Incubating Room and for Installing Electric Temperature Control.

The room should be constructed of brickwork 9 inches thick and perfectly square inside, 6 x 6 ft. and about 7 ft. high. There should not be any windows, but two doors, the outer door being closed before opening the inner door of the chamber. These doors should be made of white pine 2 inches thick and the walls glazed or covered with parian cement and the floor and ceiling insulated with slag wool. A 9-inch ventilator should be fixed near the ceiling and nine 1-inch holes in the bottom of each door.

Attach the Automatic Switch and blow out of marble base outside the room to be heated, in a convenient position and bring the main supply to this switch and connect at the back of switch base. Place the four Radiators in the incubating room, one on each side between the first two shelves (not on the floor) and carry wires from the Automatic Switch to each Radiator in parallel and connect to the terminals indicated. Place the Capsule Switch with lamp about the height of the third shelf (not against the wall) and carry wires from this to the Automatic Blow-out Switch and connect to terminals indicated.

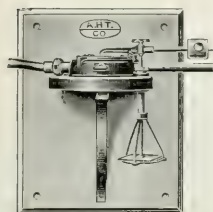
The installation is then complete and the current may be turned on. The Radiators will heat up and continue to do so until the Capsule expands and interrupts the current, when the magnetic coils will drop the armature and the current will cease to flow to the Radiators which will cool down until the Capsule again collapses when the current will be again switched on. This will continue automatically.

To increase the temperature screw down the milled head screw on Capsule Switch a turn or two at a time; to decrease the temperature reverse the process. See that the carbons on the Automatic Switch touch each other perfectly, otherwise a spark of eruption will occur and cause rapid deterioration. There must be no sparking except at the moment of breaking contact.

**20816. Incubating Room Temperature Control for Electric Heating, Hearson,** as above described. When the capsule is collapsed the lever arm is kept in position by the solenoid, and the current is free to pass to the heaters. Upon the expansion of the capsule contact is broken, the solenoid ceases to act, the lever arm drops suddenly and the current to the radiators is checked and by means of the electric blow-out, the sparking is reduced to a minimum. The current remains cut off until the temperature of the room is so reduced as to allow the capsule to contract and contact again be made. The outfit consists of capsule switch, four radiators and blow-out panel switch and is based on keeping a room 6 x 6 x 7 ft. at a constant temperature. Larger rooms must be supplied with additional radiators. Price of outfit for either direct or alternating current.

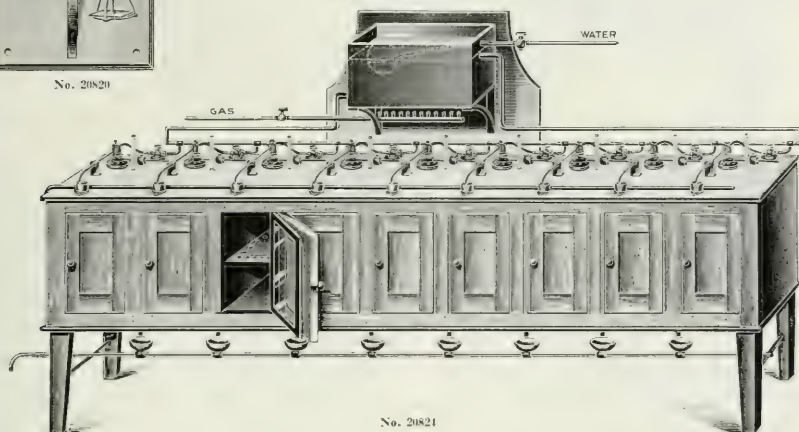
Duty Free..... 94.50

Duty Paid..... 141.75



No. 20820

**20820. Incubating Room Temperature Control for Gas Heating.** With a well insulated room a uniform temperature can be maintained within  $2^{\circ}$  with the use of the gas valve regulator and a suitable gas stove. It is advisable to arrange ventilation in both the lower and upper parts of the room for the purpose of temperature equalization and avoidance of smell from the products of combustion and gases of fermentation, etc. The regulator may be placed at any convenient position, usually near the door. Price is for gas valve with capsule only..... 13.50

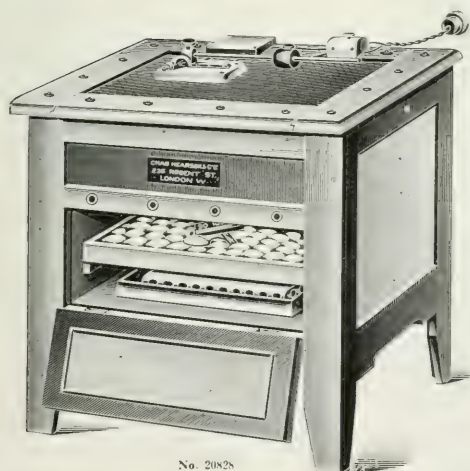


No. 20824

**20824. Incubator, Hearson New Compartment.** For either high or low temperatures. Consisting of nine compartments of copper, water-jacketed and insulated, each compartment being 7 x 8 x 6 inches. Temperature may be adjusted from  $25-32^{\circ}$  C.,  $32-40^{\circ}$  C.,  $40-47^{\circ}$  C., or any other predetermined range. Each compartment is fitted with a Hearson control capsule which automatically controls the entry of warm water from the heating tank either into the water jacket surrounding each compartment or to the waste. A difference in temperature of less than a degree in the compartment suffices to change the flow of warm water. A control capsule is connected with the heating tank also so that the supply of warm water is constantly under control. All the compartments may be operated independently of one another.

Duty Free..... \$345.15

Duty Paid..... \$517.75

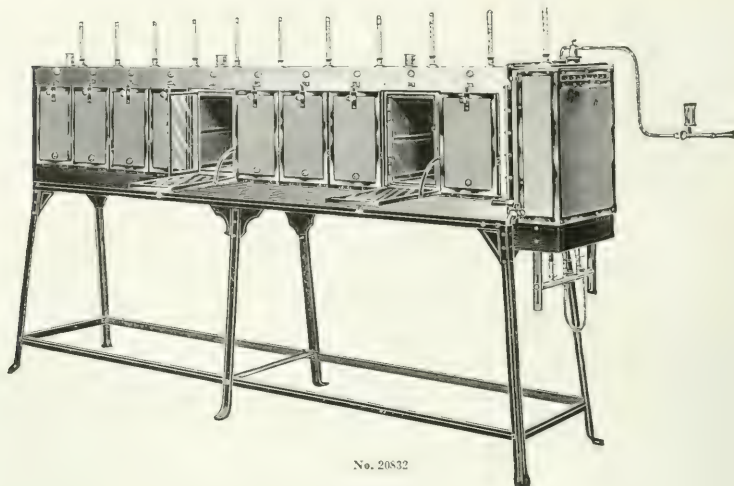


No. 20828

**20828. Incubator, Embryological, Hearson Electric,** operating on the same principle as the Hearson bacteriological incubators previously described, capacity 50 eggs. This is a very much more convenient apparatus than the usual chicken incubator used for embryological purposes. Voltage must be specified in ordering.

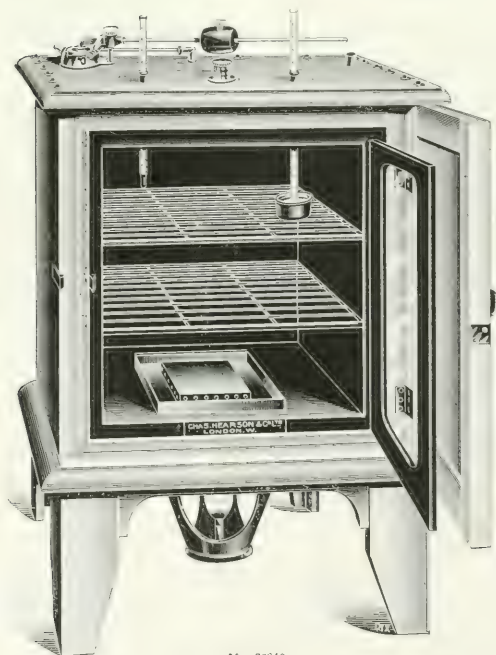
Duty Free..... 37.80

Duty Paid..... 56.70



No. 20832

20832. Incubator, Compartment form, for different temperatures in the various compartments between 24° and 60° C. Each compartment is 30 x 20 x 25 cm. With both glass and metal doors. With burner, thermo-regulator, etc., but without thermometer. With ten compartments as shown in illustration.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 396.00 | Duty Paid..... | 480.00 |
|----------------|--------|----------------|--------|
20836. Incubator, Compartment form, same as above but for low temperatures, i. e. between 0 and 22° C. with ice box and ice water cooling arrangement.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 495.00 | Duty Paid..... | 600.00 |
|----------------|--------|----------------|--------|



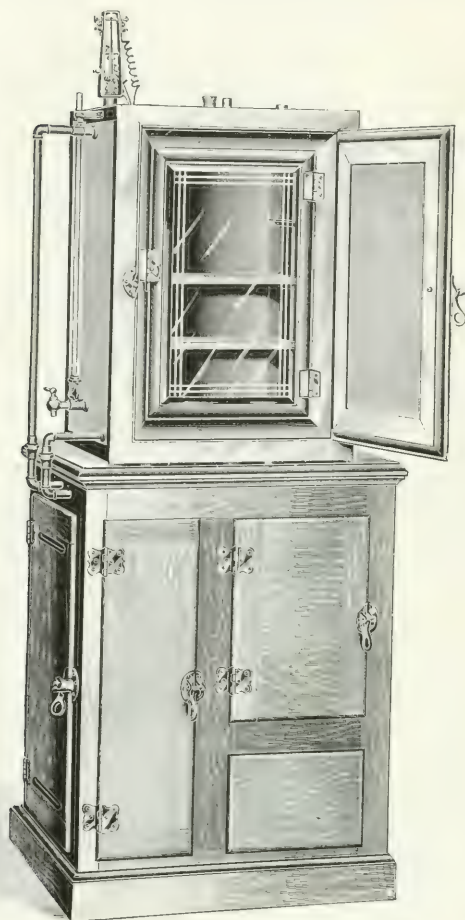
No. 20840

20840. Incubator, Hearson, Parasite, as suggested by Dr. Boycott of Guy's Hospital, London. With adjustable ventilator. The air is heated by passing through tubes in the warm water in the tank after which it passes over a water tube in order to take up sufficient moisture. With fitted thermometer and hygrometer to show moisture percentage in the interior of the incubating chamber. Size inside, 20 x 20 x 14 inches. Similar in construction and operation to the Hearson gas incubators.

Duty Free.....	101.25
Duty Paid.....	152.00







No. 20876

**20876. Incubator, Low Temperature, Giddings.** The incubator proper is regular water-jacketed type with outer air space and covered with a heat insulating material. Beneath the incubator is an ice chest fitted with coils of pipe, which are connected to the water jacket of the incubator so that the water may circulate freely. In the pipe line is a pump operated by an electric motor. This motor is controlled by a thermostatic bar which makes and breaks the circuit through a solenoid switch, energized by the line, thus rendering the operator independent of the troublesome dry battery.

The regulation is effected as easily as with the ordinary electric incubator, the temperature for which the thermostat is adjusted remaining constant within  $\frac{1}{2}^{\circ}$ . All parts are readily accessible, and the construction is very simple. To put the equipment into operation it is only necessary to connect the feed wires and turn on the current.

The cooling arrangement permits practically any desired temperature below that of the room to be maintained. If a temperature below the freezing point is required, cracked ice and sodium thiosulphate (hypo) are placed in the ice-chest, while from 4 to 12 liters of water are drawn off and replaced by a solution consisting of 50% of glycerine and 50% of alcohol (95%).

Please specify voltage and current in ordering. If for alternating current also state number of cycles. See *Phytopathology*, Vol. II, p. 106, 1912.

Size, cm. .45x75x35 70x45x35 48x45x35

Each..... 290.00 270.00 235.00

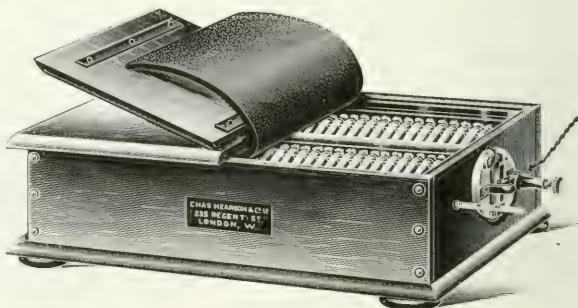
Size, cm. .48x45x24 48x30x24 24x30x24

Each..... 210.00 190.00 170.00

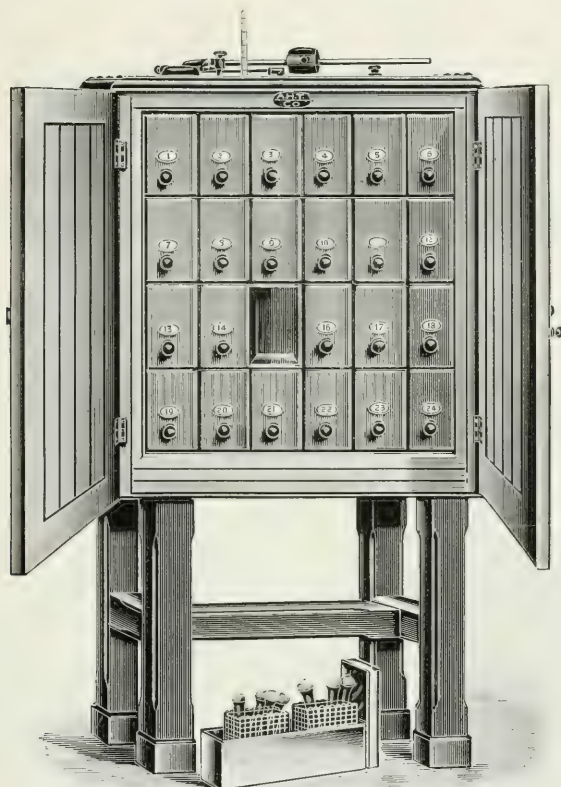
**20880. Coagulator for Blood Serum (Inspissator), Hearson Anhydric Electric**, operating exactly the same as Hearson Incubators. For 40 tubes. Voltage and temperature must be given when ordering. Complete with thermometer. Inside dimensions 22 $\frac{1}{2}$  inches long, 10 $\frac{1}{2}$  inches wide by 3 inches deep, holds four trays each containing 10 tubes.

Duty Free..... 39.00

Duty Paid..... 58.50



No. 20880



No. 20884

**Hearson Cellular Incubator for Students' Use.** This Incubator is heated by gas or electricity and the fittings for regulating the temperature are the same as in those previously described. Prices given below are for gas heating. Electric heating adds \$21.00 duty free and \$31.50 duty paid to the list prices printed below.

This utensil is designed for use in educational laboratories where it is desirable to provide each student with a separate incubating chamber or drawer which may be removed from the apparatus without affecting the temperature of the remaining drawers. The inside of the utensil is strongly made of heavy copper, firmly stayed at frequent intervals. Each drawer of the size  $13\frac{1}{2} \times 8\frac{1}{2} \times 4\frac{1}{2}$  inches will accommodate about 60 culture tubes.

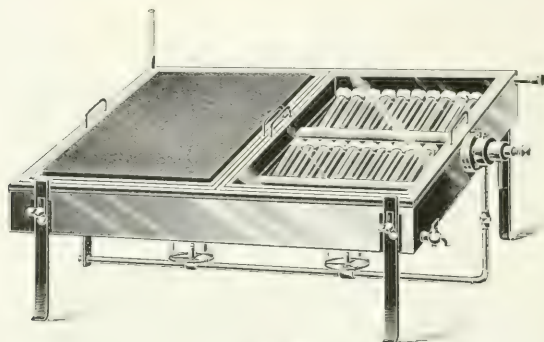
Seven flat copper tubes, extending the whole length of the drawers, form the sides and divide the apparatus into six vertical compartments; these are again sub-divided by eighteen terne-iron shelves, into four divisions horizontally, thus forming twenty-four pigeon holes water-jacketed in every case on two sides.

All the vertical tubes are joined to horizontal tanks at the top and bottom, so that the water is free to move up or down any of the tubes, or even up and down different parts of the same tube, thus equalising the temperature in all directions.

The drawers are made of terne-iron, which is not liable to rust, and each drawer has a thick varnished wood front, bearing a number which serves to show the order in which they should be replaced and enables the student to easily recognize the compartment allotted to him. The removal of one or more drawers does not appreciably affect the temperature of those which remain, and when the outer doors have been closed for a short time the temperature is practically the same in all parts.

										Duty Free	Duty Paid
20884.	Cellular Incubator, for Gas, with 24 drawers, each $13\frac{1}{2} \times 8\frac{1}{2} \times 4\frac{1}{2}$ inches.....									\$172.50	\$258.75
20888.	" " " " " 12 " " " 9 x $4\frac{1}{2}$ x 14 " .....									136.50	204.75
20892.	" " " " " 12 " " " 9 x 9 $\frac{1}{2}$ x 14 " .....									183.00	274.50

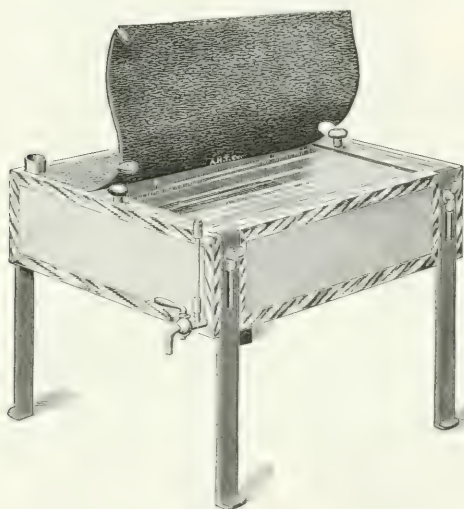




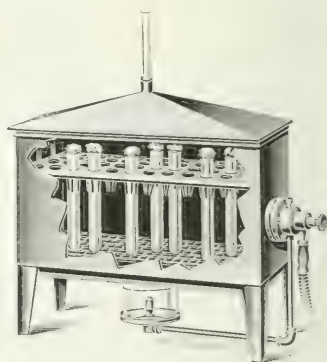
No. 20896

20896. Coagulator for Blood Serum (Inspissator), Hearson, with Patent capsule temperature control, for gas heating. The utensil is strongly made of copper, with trays holding serum tubes at a proper angle.

To hold, tubes.....	20	40
Duty Free.....	39.00	52.50
Duty Paid.....	58.50	78.75



No. 20900



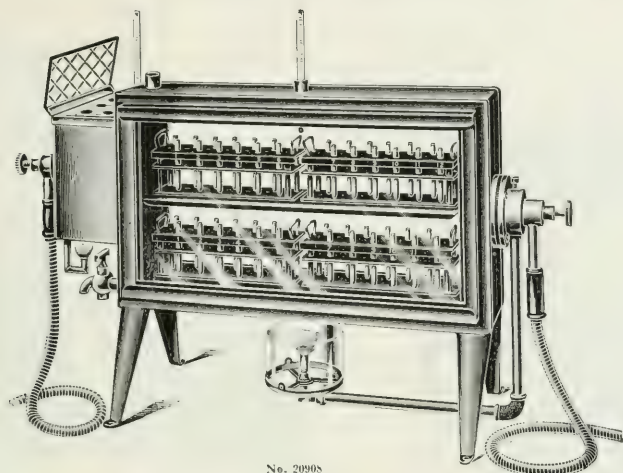
No. 20904

20900. Coagulator for Blood Serum (Inspissator). The two front legs are slotted so that the oven may be tilted for securing necessary slants to the test tubes. Of same construction as American Standard Incubators. Without thermometer, burner or thermo-regulator.

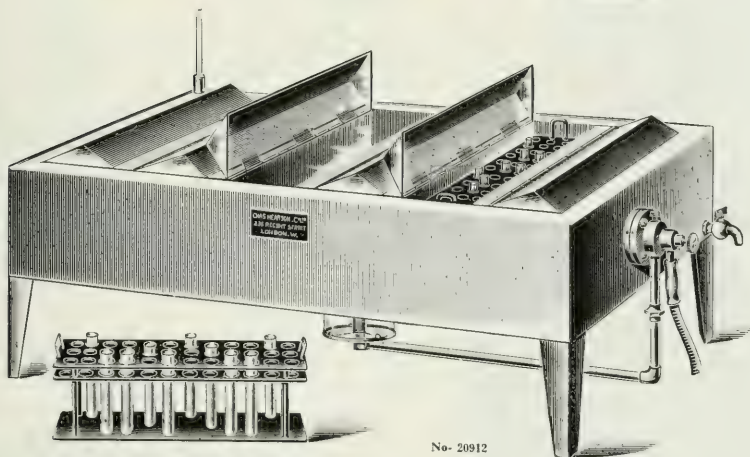
Inside dimensions, inches.....	12 x 10 x 2½	16 x 14 x 2½
Each.....	21.00	27.00

20904. Water Bath for Vaccine Cultures, Hearson, of heavy copper, with burner and Hearson Capsule for control, with removable rack for 48 test tubes.

Duty Free.....	26.25	Duty Paid.....	39.50
----------------	-------	----------------	-------



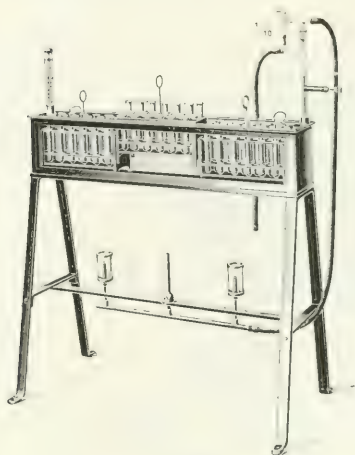
No. 20908



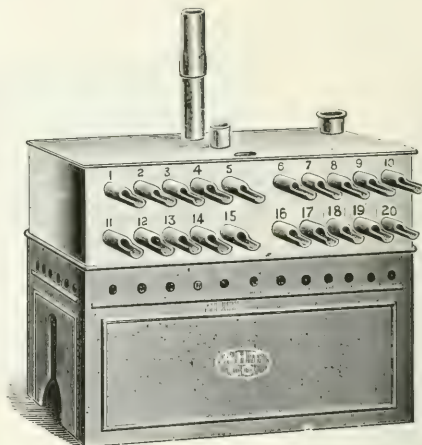
No. 20912

20908. **Water Bath and Incubator, Hearson, for Wasserman Test** This apparatus consists of a strong copper vessel, nickel-plated, on a stand. The incubator is a double sided reservoir and is provided with a glass front and back. It is intended to be used on a bench facing the light. On the side of the apparatus a small tank is fixed, to which Hearson's control capsule is attached. This is regulated for 56 to 60° C. for the sterilization of liquids, and is provided with two perforated plates, one to take ordinary test tubes and other for small tubes. It is also provided with a hinged cover held in place by a spring which is laid over the wadded stoppings of the reagent tubes in order that they may remain in the water. The incubator itself is fitted with Hearson's control capsule and is regulated for 38° C. Thermometers are provided for two compartments, also two racks. The whole forms a very useful and complete set for the study of the Wasserman process.

	<b>Duty Free</b> .....	55.00	<b>Duty Paid</b> .....	80.00
20912. <b>Water Bath, Hearson, for Wasserman Reactions, etc., with Hearson Patent Capsule control and removable test tube racks and covers for same while in the bath. Each tray holds 36 tubes.</b>				
Number of trays.....			2	4
				6
<b>Duty Free</b> .....		37.80	60.00	75.60
<b>Duty Paid</b> .....		56.70	90.00	113.40

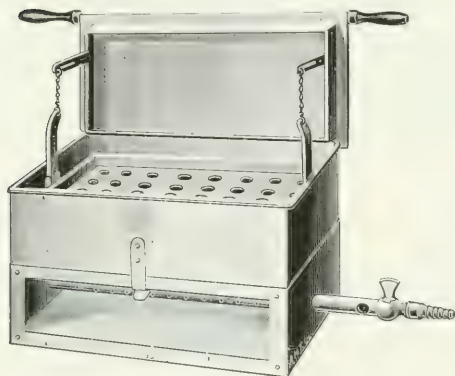


No. 20916

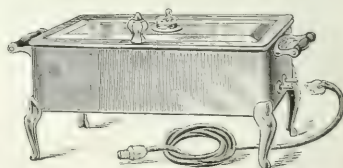


No. 20920

20916. **Water Bath, for Wasserman and other Serological Reactions, Liefmann-Meier;** with three metal test tube racks containing 72 tubes. The front wall of the bath is of glass and the back is finished in white to enable accurate observations of reactions without removing the trays. With two burners, thermo-regulator, and thermometer as shown in cut but without test tubes. **Duty Free** ..... 33.10 **Duty Paid** ..... 40.05
20920. **Incubator, Opsonic,** with 20 tubulations for pipettes, each with serial number. Of heavy, polished copper, on sheet iron base 8 inches high; with tubulations for thermometer, gas regulator and filler, and a cup 1 x 3½ inches for holding instruments. Size 14 x 8 x 4 inches. .... 17.25
20924. **Incubator, Opsonic,** same as above, but including 6 tubes, ⅜ inch diameter, in the top to hold test tubes. .... 21.00



No. 20928



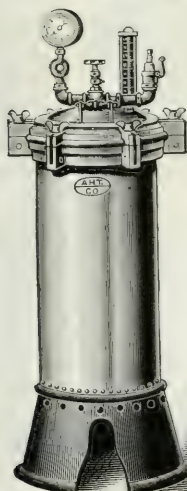
No. 20932

20928. **Sterilizer, Instrument,** convenient in the pathological and bacteriological laboratory for the sterilization of syringes, instruments for animal operations, etc. The tray carrying the syringes or instruments is lifted clear of the water when the lid is raised and supported in this position. Of copper, nickel plated, 10 x 5 x 3 inches. .... 15.00
20932. **Sterilizer, Instrument** for purposes similar to above but for electric heating. With automatic cut-out which cuts off the current if sterilizer is allowed to run dry. Complete with 5 ft. of cord, connector and lamp socket plug. Apparatus is of copper, nickel plated. Dimensions 10 x 4½ x 2 inches. With three heats. .... 18.00

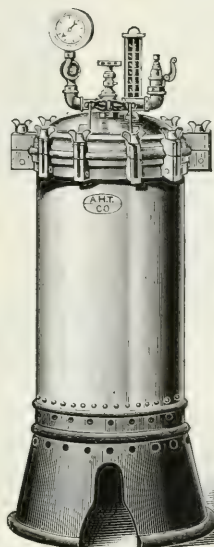




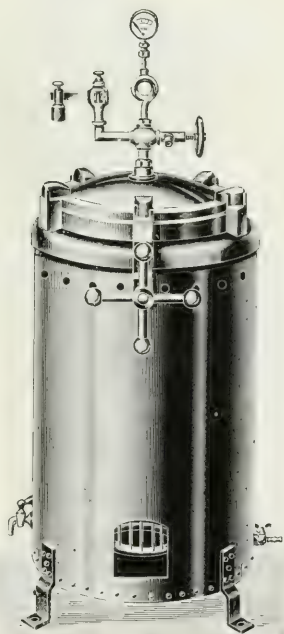
No. 20956



No. 20936

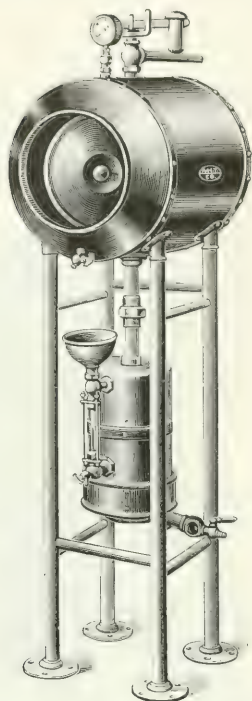


No. 20944

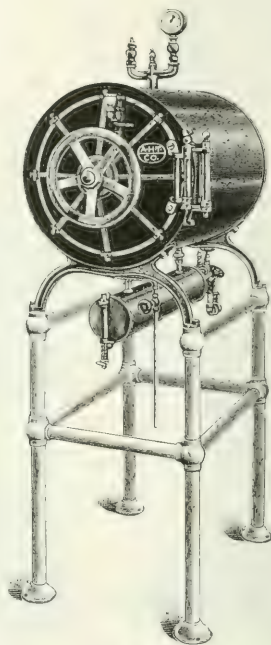


No. 20948

20936. Autoclave or Vertical Steam Pressure Sterilizer, American Standard. Of heavy polished copper tin lined. Lids of heavy cast brass, nickel plated and fitted with steam-tight, ground in bevel joint, obviating entirely the use of washers. This apparatus is the most widely used autoclave in bacteriological work and has been supplied by us to many leading laboratories for over fourteen years, with unflinching satisfaction. Each apparatus is tested and guaranteed to stand a pressure of 35 lbs. to the square inch, and is provided with proper gauge and thermometer, reading both in temperature degrees and pounds pressure, also safety valve. With six screw clamps on lid. Prices on gas and oil heated apparatus include suitable burners. Prices on electric heating include cord and plug and electric heater. Inside dimensions 11 inches diameter by 24 inches deep.
- |           | With gas heating equipment | With oil heating equipment | With electric heating equipment |
|-----------|----------------------------|----------------------------|---------------------------------|
| Each..... | 60.00                      | 64.65                      | 100.00                          |
20940. Autoclave, same as No. 20936, but with hinged lid.
- |           | With gas heating equipment | With oil heating equipment | With electric heating equipment |
|-----------|----------------------------|----------------------------|---------------------------------|
| Each..... | 65.00                      | 70.65                      | 105.00                          |
20944. Autoclave, same as No. 20936, but with ten screw clamps on hinged lid. Inside dimensions 14 inches diameter by 26 inches deep.
- |           | With gas heating equipment | With oil heating equipment | With electric heating equipment |
|-----------|----------------------------|----------------------------|---------------------------------|
| Each..... | 90.00                      | 97.00                      | 130.00                          |
20948. Autoclave, or Vertical Steam Pressure Sterilizer, German type with instantaneous clamping device for lid, manometer, safety valve, drain cock, etc.; and burner permanently fixed in jacket of apparatus. Boiler is of heavy, seamless hammered copper, heavily tinned on the inside, enclosed in enamelled iron outer ventilating jacket. Lid is of brass and all trimmings are heavily nickel plated. With tripod inside for supporting baskets, etc. Adjusted for a working pressure of 15 lbs., equal to a temperature of 121° C. Inside dimensions 200 x 400 mm.
- |   | Duty Free | Stock |
|---|-----------|-------|
| 20952. Autoclave, as above, with petroleum burner, for use where gas is not available.  | 63.00     | 84.00 |
| Duty Free.....  | 66.30     |       |
| 20956. Wire Basket, nickel plated, for above, with hinged lid, 200 mm diameter by 200 mm high, i. e., two baskets exactly fill autoclave. Very convenient for test tubes. |           | 88.80 |
| Duty Free.....  | 5.05      | 6.75  |



No. 20960



No. 20964

- 20960. Autoclave or Steam Pressure Sterilizer, Horizontal Form.** No mechanical fastening whatever is used to secure the door and no packing or gasket is used to make the joint steam-tight. The steam pressure from within seals the door absolutely. The apparatus is made of heavy, polished copper with a double wall or jacket. Can be used for steam, gas or petroleum heating, but will be supplied for use with gas unless otherwise specified. Because of the double jacket the cotton plugs in the culture tubes are absolutely dry when the door is opened. When this sterilizer is supplied for direct steam connection the generator shown in illustration is not required, for which we make an allowance of from \$10.00 to \$17.00 depending upon the size of the sterilizer. Inside dimensions, inches.....

16 x 12	20 x 16	24 x 20	28 x 22	28 x 25
---------	---------	---------	---------	---------

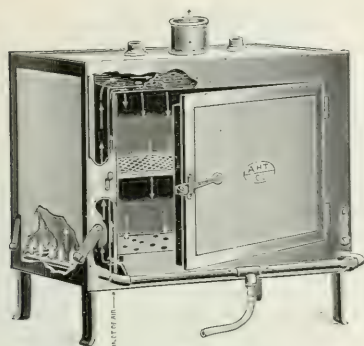
Each.....	130.00	150.00	175.00	250.00	333.00
-----------	--------	--------	--------	--------	--------

- 20964. Autoclave or Steam Pressure Sterilizer, Horizontal Form, double cylinder type with steam space entirely surrounding except at the door of entrance.** A particular feature of this sterilizer is the fact that the contents of the inner chamber become perfectly dry within one minute after the steam is withdrawn. Ebonized or enameled bronze door and frame with copper end, seamless drawn brass or copper shell (tinned internally) forming walls of sterilizing chamber, jacket and all fittings highly polished and nickel plated, mounted on white enameled tubular steel stand. Heating can be done by steam, gas or petroleum as ordered but will be supplied for gas heating unless otherwise specified.

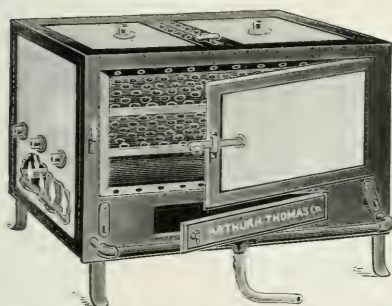
Inside dimensions, inches..	9 x 19	12 x 20	14 x 22	16 x 24	20 x 28	24 x 32
-----------------------------	--------	---------	---------	---------	---------	---------

Each.....	175.00	225.00	300.00	350.00	450.00	650.00
-----------	--------	--------	--------	--------	--------	--------

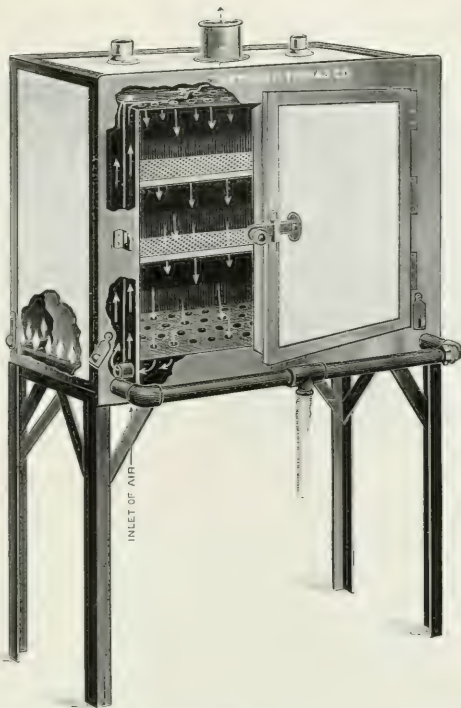
**Note.** When arranged for steam or gas heating, we recommend the use of the special auto-control valve, so designed that when the desired pressure is reached the supply is cut down just enough to maintain such pressure. This adds \$10.00 to the cost of each of the above sizes.



No. 20968



No. 20984

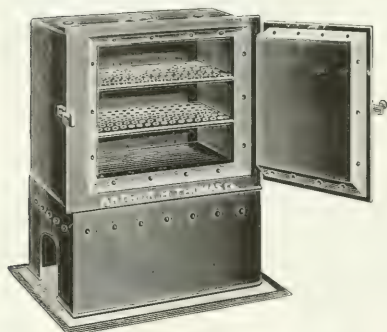


No. 20980

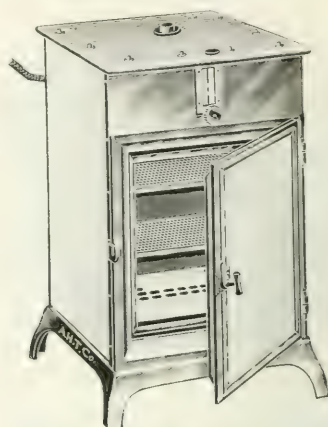
20968. **Hot Air Sterilizer, with Regenerative Heating System**, so-called "Lautenschläger" form. Of best Russia iron, covered with asbestos on the outside. With three walls, providing two air spaces. When heated by gas, a row of small Bunsen burners placed around the outside of the base creates a circulating hot air current which passes through the oven as indicated by the arrows in the illustration. When heated by petroleum blast burner, or by electric units placed in the base, the circulation occurs in the same way. The electric heating device provides one heat and includes cost of relay and regulator. A temperature of 360° F. (182° C.) may be had with the electric heater in 20 minutes. The gas heated sterilizer may be used for either gasoline gas or natural gas by the use of adjustable burners in place of the regular. These are furnished upon order at a slight extra charge. Inside dimensions 12 x 18 x 9 inches. On low base, with thermometer, range 200° C. Style.....

	With gas heating equipment	With oil heating equipment	With electric heating equipment
Each.....	47.75	59.00	100.25
20972. <b>Hot Air Sterilizer</b> , same as above, but with inside dimensions 18 x 24 x 14 inches on low base, with thermometer Style.....	With gas heating equipment	With oil heating equipment	With electric heating equipment
Each.....	65.00	77.75	130.25
20976. <b>Hot Air Sterilizer</b> , same as above, but with inside dimensions 24 x 30 x 18 inches on low base, with thermometer Style.....	With gas heating equipment	With oil heating equipment	With electric heating equipment
Each.....	110.00	128.75	173.75
20980. <b>Hot Air Sterilizer</b> , same as above, but on high base with thermometer. Inside dimensions 30 x 36 x 20 inches Style.....	With gas heating equipment	With oil heating equipment	With electric heating equipment
Each.....	166.25	196.25	263.75
20984. <b>Hot Air Sterilizer</b> , double wall, asbestos covered, with built-in burners, for gas heating only, with thermometer. Inside dimensions, inches.....	12 x 24 x 12	19 x 12 x 9½	18 x 24 x 14
Each.....	38.75	31.25	46.25





No. 20988

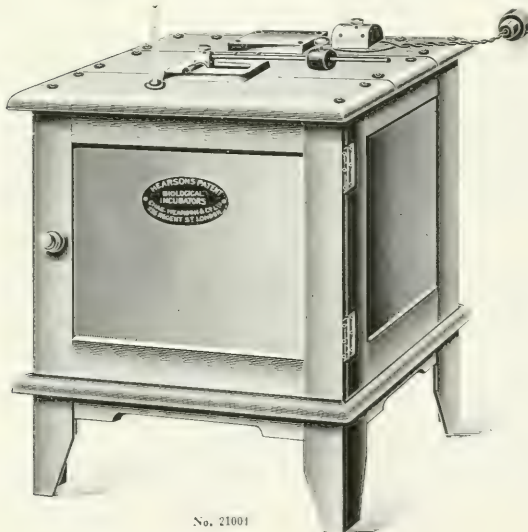


No. 21000

20988. **Hot Air Sterilizer**, double wall, of sheet iron, with enclosed base, asbestos mat, thermometer and burner. With two shelves. Inside dimensions 10 x 12 x 10 inches. 19.75
20992. **Hot Air Sterilizer**, same as No. 20988, but with one shelf and inside dimensions 9 x 9 x 6 inches. 13.10
20996. " " " of sheet iron, double wall. Wall form, with fork to hold burner. Including thermometer and burner. Inside dimensions 11 x 9 x 9 inches. 15.75
21000. **Sterilizer, Freas Patent Electric**. The general construction, regulating and heating of the Freas' Electric Dry Sterilizer is identical with that of the Freas' Electric Incubator, the only difference between them being that the Sterilizer is graduated for temperatures up to 175° C. and accordingly provided with heating plate wound for 600 watts. The Sterilizer is not provided with inside glass door, while the insulation space between the walls is greater than with the Incubator, on account of the higher temperatures maintained.

Inside dimensions, in.....	7 x 7 x 10	12 x 12 x 12	14 x 17 x 18
Each.....	50.00	72.00	165.00

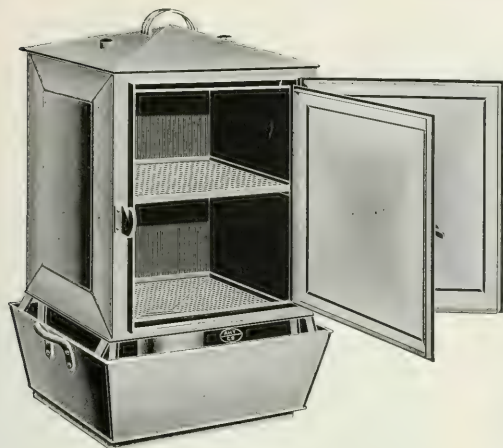
Note—Size 14 x 17 x 18 inches is mounted on heavy iron base with legs, total height about 5 ft.



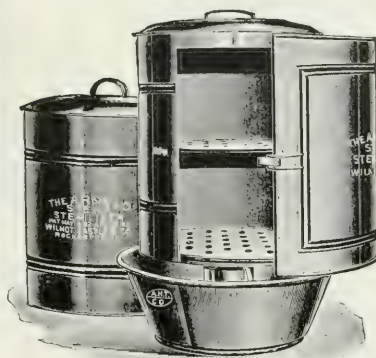
No. 21001

21004. **Sterilizer, Hot Air, Hearson, Electric**, adjustable for temperatures from 150° to 175° C. The operation is similar to that of the Hearson Electric Incubators except that the heating unit is provided for higher temperatures and a better insulation is built in.

Inside dimensions, inches	Duty Free	Duty Paid
12 x 9 x 9	45.00	67.50
15 x 12 x 12	51.75	77.65
18 x 15 x 15	70.50	105.75
22 x 15 x 15	94.50	141.75



No. 21008



No. 21020

21008. **Arnold Steam Sterilizer, Boston Board of Health Form.** Of tin lined copper throughout. Without stand or burner.

Inside dimensions, inches.....	16 x 12 x 12	13 $\frac{1}{4}$ x 8 x 8
Each.....	40.00	35.00

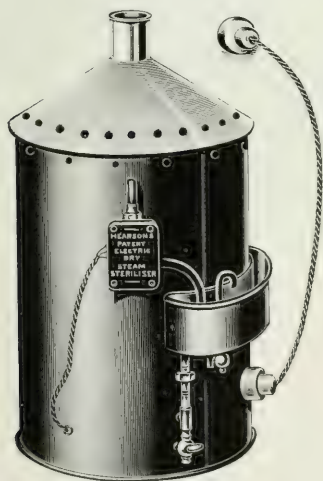
21012. **Arnold Steam Sterilizer, same as above but with rectangular sheet iron stand, 6 inches high, and Fletcher radial burner.**

Inside dimensions, inches.....	16 x 12 x 12	13 $\frac{1}{4}$ x 8 x 8
Each.....	44.00	39.00

21016. **Hearson Automatic Electric Steam Sterilizer.** This Sterilizer is operated upon any ordinary lamp socket (voltage must be specified in ordering) and, in addition, connection established with a constant water supply with overflow to sink. The apparatus operates absolutely automatically from the moment the switch is turned on. When the water boils the current is automatically reduced and no more current is consumed than is required to keep the chamber full of steam. Where a constant water supply with sink

for disposal of waste is not available, one pint of water will operate the sterilizer for twenty-four hours without attention. Flasks of media may be placed on the bottom of the sterilizer without danger of cracking and the filtration of agar effected without special precautions. The outfit is extremely economical in current consumption, gives off no fumes of any kind and allows no steam to escape.

Height, inches.....	10	22
Diameter, inches.....	8	12 $\frac{1}{2}$
Duty Free.....	63.00	84.00
Duty Paid.....	94.50	126.00



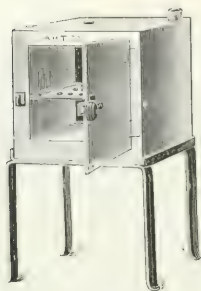
No. 21016

- 21020.\* **Arnold Steam Sterilizer, Cylindrical Form.** Automatically maintains a constant temperature of 100° C without attention. Of tin, with copper bottom.

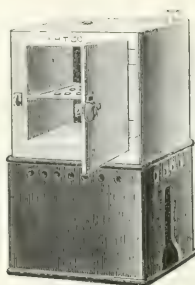
Inside dimensions, inches.....	7 $\frac{1}{4}$ x 8 $\frac{1}{2}$	10 $\frac{1}{4}$ x 9 $\frac{1}{4}$
Each.....	3.50	4.50
Inside dimensions, inches.....	11 $\frac{1}{4}$ x 10 $\frac{1}{2}$	12 $\frac{1}{2}$ x 11 $\frac{1}{4}$
Each.....	5.00	5.50

21024. **Arnold Steam Sterilizer, same as above but of copper throughout.**

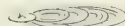
Inside dimensions, inches.....	7 $\frac{1}{4}$ x 8 $\frac{1}{2}$	10 $\frac{1}{4}$ x 9 $\frac{1}{4}$
Each.....	9.25	13.75
Inside dimensions, inches.....	11 $\frac{1}{4}$ x 10 $\frac{1}{2}$	12 $\frac{1}{2}$ x 11 $\frac{1}{4}$
Each.....	15.00	17.00



No. 21028

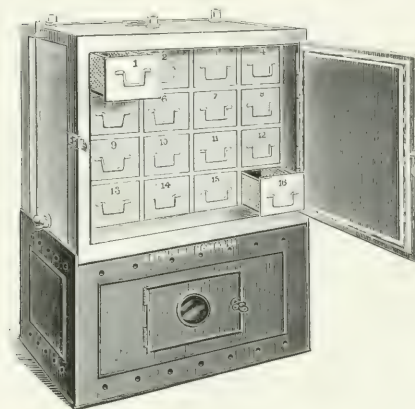


No. 21032

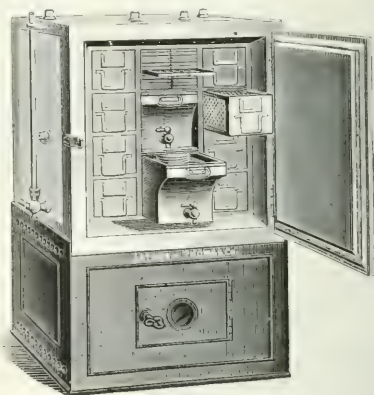


No. 21036

21028. **Paraffine Embedding Oven**, double wall, of heavy sheet copper, on wrought iron stand, with extra sheet iron bottom to prevent burning out. With perforated shelf, but without burner, thermometer or thermo-regulator.  
Inside dimensions, inches.....  $5\frac{1}{2} \times 5\frac{1}{2}$  .....  $7\frac{1}{2} \times 7\frac{1}{2}$  .....  $9\frac{1}{2} \times 9\frac{1}{2}$   
Each ..... 8.00 ..... 10.00 ..... 14.00
21032. **Paraffine Embedding Oven**, same as above but with enclosed sheet iron base to protect burner from drafts.  
Inside dimensions, inches.....  $5\frac{1}{2} \times 5\frac{1}{2}$  .....  $7\frac{1}{2} \times 7\frac{1}{2}$  .....  $9\frac{1}{2} \times 9\frac{1}{2}$   
Each ..... 9.00 ..... 11.00 ..... 15.00
21036. **Extra for Copper Rings** to fit any size of Nos. 21028 or 21032 Ovens so that same may be used as a water bath ..... 1.50



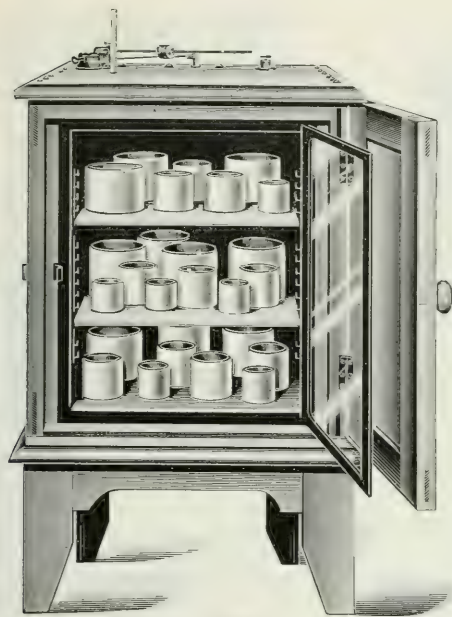
No. 21044



No. 21048

21040. **Paraffine Compartment Embedding Oven, Lillie**, of polished copper with double walls, of same general construction as American Standard Incubators. Drawers  $10 \times 4 \times 3\frac{1}{2}$  inches with sides and back of perforated zinc. On sheet iron base  $10\frac{1}{2}$  inches high. Gas heating equipment includes metallic connecting tube, Greenman burner, Greenman thermo-regulator and thermometer. Oil heating equipment includes oil lamp, regulating device and thermometer. Electric heat includes three heat disc for temperatures up to  $60^{\circ}\text{C}$  with relay and regulator.
- | Style..... | Without equipment | With gas heating equipment | With oil heating equipment | With electric heating equipment |
|------------|-------------------|----------------------------|----------------------------|---------------------------------|
| Each.....  | 72.00             | 91.25                      | 110.25                     | 135.85                          |
21044. **Paraffine Embedding Oven**, same as No. 21040 but with 16 drawers.
- | Style..... | Without equipment | With gas heating equipment | With oil heating equipment | With electric heating equipment |
|------------|-------------------|----------------------------|----------------------------|---------------------------------|
| Each.....  | 102.00            | 121.25                     | 138.25                     | 168.85                          |
21048. **Paraffine Compartment Oven, Lillie, Improved Model**, similar in construction and equipment to No. 21040. With 8 drawers and 2 receptacles with screw tops and stopcocks to enable the contents to be run into moulds as required. With 12 perforated trays for drying and fixing purposes. On base 15 inches high.
- | Style..... | Without equipment | With gas heating equipment | With oil heating equipment | With electric heating equipment |
|------------|-------------------|----------------------------|----------------------------|---------------------------------|
| Each.....  | 165.00            | 194.25                     | 207.85                     | 240.85                          |





No. 21032



No. 21060

21032. **Paraffine Embedding Ovens, Hearson, for gas heating.** These utensils are identical with the Hearson bacteriological Incubators for gas heating listed on p. 24, excepting that the capsule is adjusted for operation at temperatures between 45° and 60° C. instead of 37½° to 40° as regularly supplied with the Incubators. These capsules can be used interchangeably with those supplied with the Incubators. Complete with burner and thermometer.

Inside measurements, inches..... 6 x 6 x 7 9 x 9 x 12 12 x 12 x 14 15 x 15 x 18 20 x 20 x 24

Duty Free..... 28.95 36.00 45.00 65.50 93.15

Duty Paid..... 43.45 54.00 67.50 98.35 140.00

21056. **Paraffine Embedding Ovens, Hearson, Anhydric Electric.** Adjusted for temperatures from 45° to 60° C. Works equally well on direct or alternating current but voltage must be stated in ordering. Identical in appearance and operation with Hearson Electric Incubators

Size, inches..... 10 x 7 x 6 12 x 9 x 9

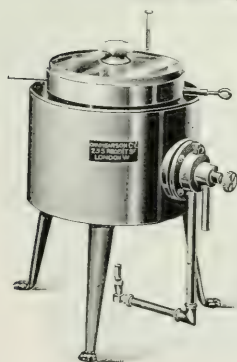
Duty Free..... 37.80 45.00

Duty Paid..... 56.70 67.50

21060. **Paraffine Embedding Bath, Coplin.** The bath is supplied with four independent cups of 3 inch diameter and one large central reservoir 7 inches in diameter, the latter connected with stopcock in front to draw off melted paraffine. Three spaces are supplied in front for heating material in glass vessels such as tall form Stender dishes. On iron base 17 inches high, with cylindrical shield for the gas flame. Without burner, thermometer or thermo-regulator.

Outside dimensions, inches..... 12 x 12 x 23 24 x 12 x 23

Each..... 33.00 48.00

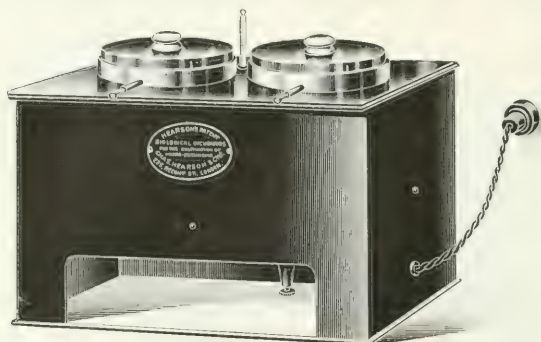


No. 21064

21064. **Vacuum Embedding Apparatus, Hearson,** consisting of a water bath with a heavy copper paraffine bath, 7 x 4½ inches, with thick plate glass lid made air-tight by means of a rubber ring. The apparatus may be used as an ordinary embedding bath, i.e., without exhaustion, or the paraffine bath proper may be exhausted by a few strokes of the air pump. The removal of all volatile reagents in which tissues have been soaked preparatory to embedding, is very much hastened by the use of this method. The control of the water bath is by Hearson's capsule. For gas heating. Price includes burner, flexible tubing and thermometer.

Duty Free..... 23.25

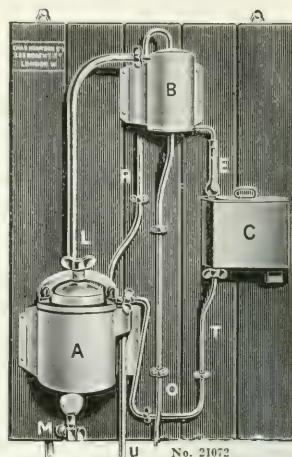
Duty Paid..... 31.50



No. 21068

21068. Vacuum Embedding Apparatus, Hearson, Electric, rectangular form, with two copper pans  $5\frac{1}{2}$  inches in diameter. Complete with thermometer, flexible cord and wall plug.  
Duty Free..... 40.50 Duty Paid..... 60.75

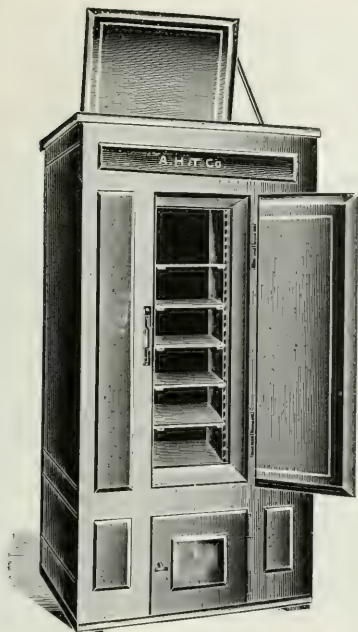
21072. Dehydrator, Hearson, for Continuous Drying of Tissues in Alcohol. This dehydrator consists of a water bath, boiler, condenser and receiver. The boiler containing the spirit to be distilled is heated by means of a gas flame through the intermediary of the water bath, the water bath being constantly replenished with the hot water which comes from the condenser. A is the water bath supplied by the pipe F through the intermediary of a small reservoir B, the surplus water from which runs to waste at the pipe E. O is the supply for cold water for condensing the vapor of the spirit as fast as it is formed. E is a glass tube to enable the spirit to be seen as it leaves the condenser. C is the receiver which must always be full of spirit up to the overflow. The spirit, overflowing from the receiver, runs into the boiler through the pipe T. The action of the dehydrator is such that the container is always full of absolute, or nearly absolute, alcohol. Tissues placed in C are rapidly deprived of their moisture and the water thus abstracted is left behind in the boiler and there unites with the hydrate of soda, which, by combining with it, becomes liquified. When all the hydrate of soda becomes liquified more must be added, or the whole of the spirit may be distilled off and fresh hydrate of soda placed in the boiler and the spirit returned to it. The apparatus is substantially made in copper and brass.  
Duty Free..... 31.50 Duty Paid..... 47.25



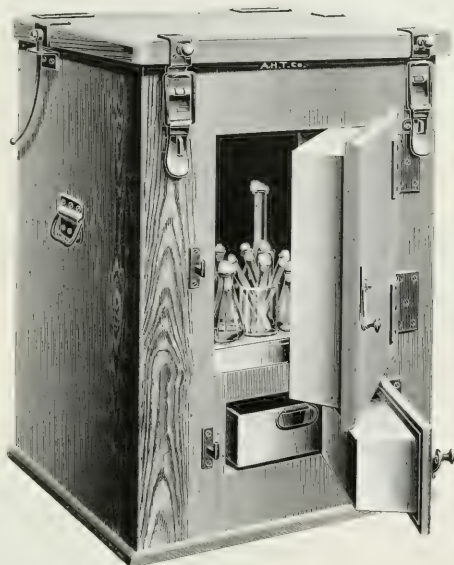
No. 21072



View in Shipping Room



No. 21076



No. 21081

21076. Cold Closet, Large Model, for maintaining a constant temperature of  $-15^{\circ}\text{C}$ ., as supplied by us to the laboratories of Henry Phipps Institute, Philadelphia, where it is giving the best of satisfaction. With careful management at ordinary room temperature the closet will maintain a temperature under the freezing point for six to eight days at a time with one filling of ice and salt.  
 Inside dimensions, cm. .... 60 x 50 x 50 ..... 100 x 50 x 50
- |                 |        |        |
|-----------------|--------|--------|
| Duty Free ..... | 148.85 | 190.60 |
| Duty Paid ..... | 180.40 | 231.00 |
21080. Cold Closet, "Frigo," for maintaining a constant temperature of  $-8$  to  $-12^{\circ}\text{C}$ . for the preservation of sera, ferments, urine and other biological products. Economical in use of ice and maintains temperatures much lower than ordinary refrigerators. Size 35 x 22 x 20 cm, inside dimensions.
- |                 |        |                 |        |
|-----------------|--------|-----------------|--------|
| Duty Free ..... | 46.75  | Duty Paid ..... | 57.00  |
| Duty Free ..... | 136.15 | Duty Paid ..... | 165.00 |
21084. Cold Closet, "Frigo," similar to above but 40 x 30 x 30 cm inside; for temperatures from  $-8$  to  $-12^{\circ}\text{C}$ .



View in Stock Room



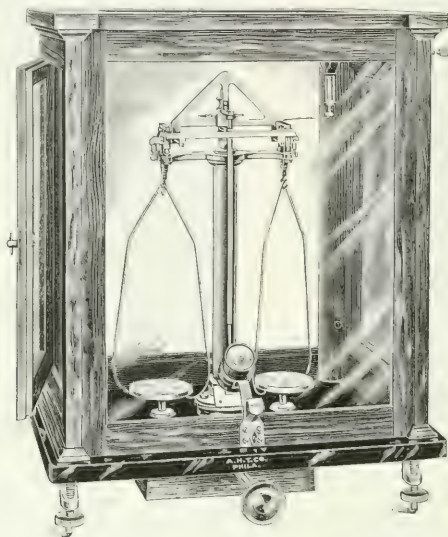
View in Packing Room



## STAUDINGER ANALYTICAL BALANCES

The three **Staudinger Analytical Balances** herein listed were first introduced by us into the United States in 1899, since which time we have been the sole United States agents for the maker, Wilhelm Spoerhase of Giessen, Germany, successor to the old firm of Carl Staudinger, established in Giessen in 1842.

**During this period we have supplied these Balances to practically every University, College and Technical School in the United States.** In some of the larger Universities, such as the University of Pennsylvania, Cornell University, etc., there are upwards of seventy-five Balances in actual use, the same type of instrument having been repeatedly ordered year after year over a period of fifteen years.



No. 21301

- 21301. Balance, Staudinger Analytical No. 1.** This Balance is designed for work in which high sensibility is required. In general construction it is the Staudinger modification of the usual German type, where the beam and pans are released simultaneously. By means of a patented rider sliding on the pointer varying degrees of sensibility are attainable and, for this reason, the No. 1 is adapted to a great variety of work. The scale is furnished with two divisions, one being for use with, and the other without, the reading microscope. The center of gravity of the system may be adjusted by the rider on the pointer so that 1 mg. equals 1 degree of the macro scale. The micro scale then divides this degree into tenths so that a direct reading to  $\frac{1}{10}$  mg. is attained through the microscope. The action with this adjustment is very rapid and the sensibility remains constant under varying loads. By raising the rider on the pointer 1 mg. equals 5 and finally 10 degrees on the macro scale so that by using the microscope to read the subdivisions on the micro scale sensibilities of  $\frac{1}{5}$  and  $\frac{1}{10}$  mg. are readily available. The times of a complete double swing for the three sensibilities are as follows:  $\frac{1}{10}$  mg. = 14 seconds;  $\frac{1}{5}$  mg. = 20 seconds;  $\frac{1}{10}$  mg. = 30 seconds.

**Capacity**—200 grams.

**Sensibility**—1-50 milligrams under full load.

**Case**—of well-seasoned mahogany, highly polished, with side doors and counterpoised front door.

**Base**—of highly polished and beveled black glass.

**Beam**—of hard welded magnalium, highly polished, 15 cm long.

**Knife Edges and Planes**—of agate throughout.

**Release and Arrest**—by means of a centrally placed milled head, half turn of which simultaneously releases beam, hangers and pans.

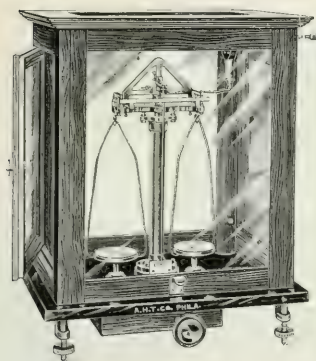
**Rider Carrier**—Patented Staudinger construction lifting the rider vertically in a straight line.

**Pans**—heavily platinum plated.

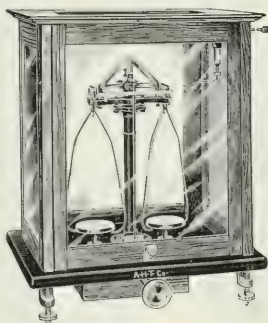
**Finish**—excepting magnalium beam all metal parts are heavily platinum plated or, if so specified, gold plated.

**Duty Free**..... 90.00      **Stock**..... 125.00

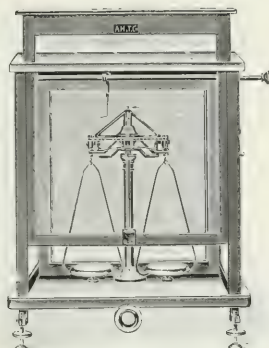
The stock prices of the Staudinger Balances have been materially reduced since the operation of the new Tariff Act of 1913.



No. 21306



No. 21308



No. 21320

- 21306. Balance, Staudinger Analytical No. 2.** This Balance is of the same general construction as the No. 1, with some simplifications and generally more robust construction, designed to stand heavier work where such high sensibility is not required. It is used in many laboratories for advanced student work as well as in industrial laboratories.

Capacity—200 grams.

Sensibility—under full load 1-10 milligram.

Case—of polished mahogany, with side doors and counterpoised front door.

Base—of highly polished and beveled black glass.

Beam—of hard welded magnalium, highly polished, 13 cm long.

Knife Edges and Planes—of agate throughout.

Release and Arrest—by means of a centrally placed milled head half turn of which simultaneously releases beam, hangers and pans.

Rider Carrier—patented Staudinger construction lifting the rider vertically in a straight line.

Pans—heavily platinum plated.

Finish—heavily nickelled with the exception of polished magnalium beam and platinized pans.

Duty Free..... 50.00                      Stock..... 70.00

- 21308. Balance, Staudinger Analytical No. 3.** This Balance is deservedly the most popular of the three and has been supplied by us in the past fifteen years to most of the principal colleges and universities in the United States and to many other laboratories. It has been designed primarily for students' use in quantitative work, and over 75 instruments are in use in some of our largest universities in the East, having been repeatedly ordered over a period of fifteen years. All of the essential features of Staudinger construction and design are incorporated and the instrument differs from the preceding Balances only in the matter of simplicity of finish and construction and sensibility.

Capacity—200 grams.

Sensibility—regular adjustment is 1-5 mg. equals 1 degree of scale. May be read to 1-10 mg. equals  $\frac{1}{2}$  degree of scale.

Case—of polished mahogany.

Base—of polished black slate.

Beam—of hard welded magnalium, highly polished, 13 cm long.

Knife Edges and Planes—of agate throughout.

Release and Arrest—by means of a centrally placed milled head half turn of which simultaneously releases beam, hangers and pans.

Rider Carrier—patented Staudinger construction lifting the rider vertically in a straight line.

Pans—heavily platinum plated.

Finish—with the exception of the pans which are platinum plated and the magnalium beam, all metal parts are lacquered in a dull black finish particularly resistant to laboratory fumes.

Duty Free..... 32.00                      Stock..... 45.00

- 21320. Balance, Analytical, Sartorius Model "U. S. A."** This new balance which has been specially designed for use in educational laboratories, has been very popular throughout the U. S. This Balance is of the German type, i.e., with simultaneous arrest of beam and pans and is fitted with Sartorius' patent compensation suspension and circular form of arrest as used on all Sartorius balances.

Capacity—200 grams.

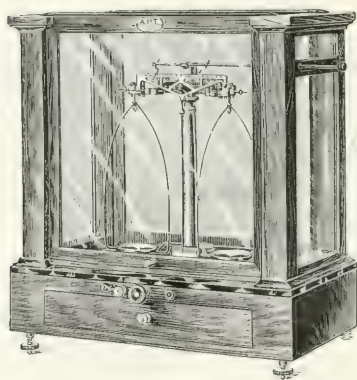
Sensibility—1-10 milligram.

Case—of polished walnut.

Beam—of aluminum.

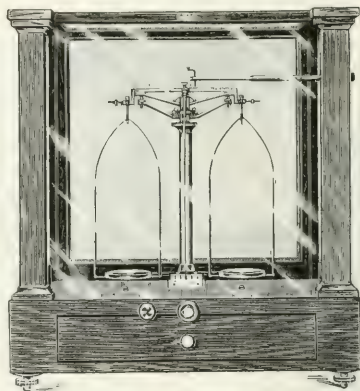
Knife Edges and Planes—of agate throughout.

Duty Free..... 39.00                      Stock..... 50.00



No. 21328

**Note**—With Standinger Balances Nos. 1, 2 and 3 two 10 mg rulers are furnished with each Balance. With Becker Balances Nos. 1 and 7 three 0 mg rulers are furnished and with Troemner Balances Nos. 10 and 30 three 0 mg rulers, all of suitable shape for convenient use.



No. 21332

- 21328. Balance, Analytical, Becker No. 1.** This is a high-grade analytical Balance, manufactured for us by the renowned firm of **Becker's Sons, Rotterdam**, and has long been in use in many leading laboratories. It is particularly adapted, because of robust construction, quick action and great sensibility, to the requirements of industrial laboratories and is highly recommended for such work.

**Capacity**—200 grams.

**Sensibility**—1-20 milligram.

**Case**—of highly polished, well-seasoned mahogany, with counterpoised front door and sliding door in rear.

**Base**—of beveled glass.

**Beam**—of aluminum, 6 inches long, graduated to 1-10 milligram.

**Knife Edges and Planes**—of agate throughout.

**Release and Arrest**—beam is arrested by center milled head and pans are arrested separately by pressure on ivory button.

**Pans**—of polished German silver.

**Finish**—with the exception of polished aluminum beam, metal parts are protected by gold lacquer very resistant to laboratory fumes.

**Duty Free**..... 68.75

**Stock**..... 125.00

- 21332. Balance, Analytical, Becker No. 7.** This Balance is also made for us by **Becker's Sons, Rotterdam**, and is especially recommended for students' use and for industrial laboratories where a higher priced Balance is not required. It is substantially made and at the same time sufficiently sensitive to give close results.

**Capacity**—100 grams.

**Sensibility**—1-10 milligram.

**Case**—of highly polished well-seasoned mahogany with counterpoised front door and sliding door in rear.

**Beam**—of aluminum, 6 inches long, graduated to 1-10 milligram.

**Knife Edges and Planes**—of agate throughout.

**Release and Arrest**—provided with the improved pan arrest with arrangement for lifting planes from the knife edges at the ends of the beams when the balance is at rest, as in the higher priced Balances. This feature is not found in other balances of corresponding price.

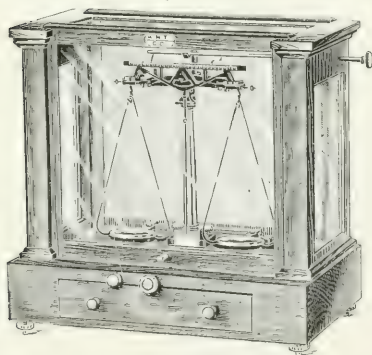
**Pans**—of polished German silver.

**Finish**—with the exception of the polished aluminum beam all metal parts are lacquered.

**Duty Free**..... 36.00

**Stock**..... 65.00

- 21324. Balance, Analytical, Troemner No. 10.** This Balance is in extensive use in industrial laboratories throughout the country, also in many of our leading universities, and needs no introduction.



No. 21324

**Capacity**—200 grams.

**Sensibility**—1-20 milligram.

**Case**—of old, well-seasoned mahogany, French polish; the front sash is counterpoised, opening up the full width of the case. The rear sash also slides up, allowing the weighing of long objects to extend beyond the outside lines of the case. The top and ends are also fitted with glass sash, thus securing plenty of light from all directions.

**Base**—top is covered with a black plate glass.

**Beam**—of cold rolled aluminum, having more than three times the tensile strength of pure aluminum, oxidized black with a non-corrosive preparation, and divided into fifty parts each side of the center knife.

**Knife Edges and Planes**—of agate throughout.

**Release and Arrest**—releasing arms are of simplest construction with three principal parts, swinging up to hold the beam and down to release it and operated by a turn button in front of case, constructed so as to bring their axes coincident with the contact line at the center knife edge and hold the beam firm and secure when the Balance is being loaded or unloaded.

**Pans**—of aluminum, 3 inches diameter, of flat shape and adjustable on the arches. Arches are of cold drawn nickel silver, gold plated.

**Finish**—all brass parts are gold plated.

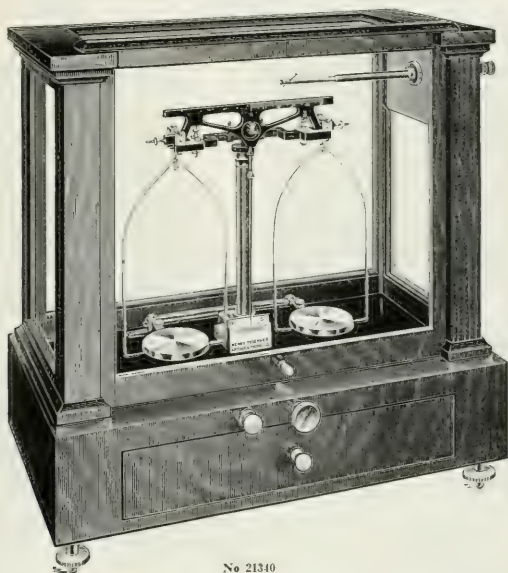
**Stock**..... 125.00



# A NEW ANALYTICAL BALANCE

TROEMNER NO. 50 . . . . . \$50.00 NET

MADE BY HENRY TROEMNER, PHILADELPHIA. FOR THE ARTHUR H. THOMAS COMPANY



No 21340

**21340. Balance, Analytical, Troemner No. 50.** After long cooperation with the firm of Henry Troemner, Philadelphia, we are enabled to offer a Balance at \$50.00, bearing his name and guarantee, but made specially for us, which will satisfactorily meet all the practical requirements of the analyst as well as any Balance now listed at \$125.00. We will send this Balance to any responsible chemist subject to trial and approval and returnable at our expense if not satisfactory. This Balance is particularly recommended to industrial chemists because of its rigid and robust construction and is guaranteed to stand the daily wear and tear in a works laboratory.

**Sensibility**—The Balance has a definite sensibility of  $\frac{1}{10}$  milligram under full load of 200 grams in each pan.

**Capacity**—200 grams in each pan.

**Case**—The case is of French polished mahogany with counterpoised front sash, with glass sash at the back, top and both ends. The base is fitted with a drawer and is provided with screw leveling feet.

**Beam**—The beam is of aluminum alloy, 7 inches long and is graduated on the right arm into fifty divisions. The special feature of this beam construction is that it is designed to support successfully without flexure a load of 200 grams in each pan, and that the knife edges are set rigid in the beam, thus doing away with any possible shifting which would make the Balance inaccurate and undependable.

**Release and Arrest**—The beam is supported by a three point rigid beam arrest that has a full-away action and releases the beam so that the contact at the center knife edge is coincident with the contact at the end knife edge, thereby avoiding all jarring and possible injury to the knife edge by a sudden shock.

**Rider Carrier**—The rider carrier is very simple in construction and is designed to be thoroughly effective and free from any possibility of derangement.

**Bearings**—Of agate throughout.

**Pointer Scale**—The ivory pointer scale is recessed see illustration so that the end of the pointer moves in the recess and in the same vertical plane as the divisions on the scale, thus avoiding all errors of parallax and making accurate readings convenient and rapid.

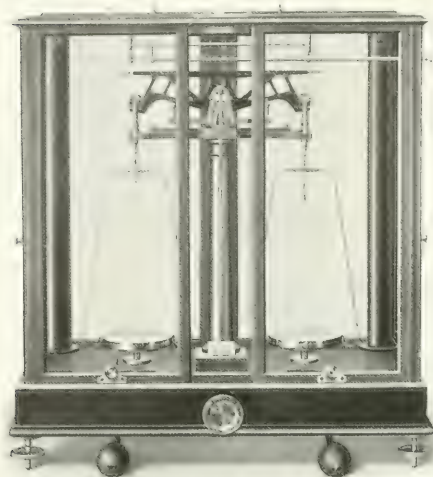
**Pan Hangers**—Of extra width and shape to conveniently accommodate a Vanier Potash Bulb.

**Price**..... 50.00

**21341. Balance, Analytical, Troemner No. 65,** exactly the same as No. 50 but with beam divided on both sides of the central knife edge instead of on the right-hand side only as in the No. 50, and with black polished plate glass base inside of the case..... 65.00

## RUEPRECHT PRECISION AND ANALYTICAL BALANCES

As supplied by us to laboratories in leading institutions throughout the United States for the highest grade of research work.



No. 21360



No. 21368

21360. **Balance, Precision, Rueprecht**, a balance of great precision and large carrying capacity, constructed upon the well-known Rueprecht system, with all moving parts heavily gold plated, in mahogany case.

Capacity grams.....	600	1000	2000	5000
Sensibility, milligrams.....	0.1	0.1	0.2	0.5
Duty Free.....	220.50	248.00	330.75	427.25
Duty Paid.....	305.25	343.50	458.00	591.50

21364. **Balance, Precision, Rueprecht**, as above, with automatic device for removing and placing weights on the right-hand beam and with arrangement for variable sensibility.

Capacity, grams.....	200	600	1000	2000
Sensibility, milligrams.....	0.05	0.1	0.1	0.2
Duty Free.....	215.00	344.50	385.85	496.10
Duty Paid.....	300.00	477.00	534.25	686.85

**Note**—The above Balances can be furnished in case constructed entirely of brass and mirror plate glass at an advance of approximately 20%.

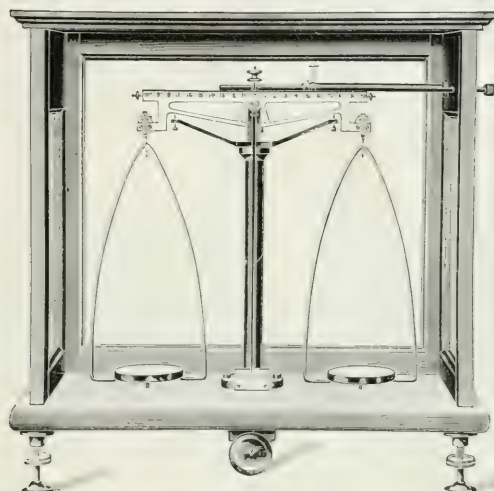
21368. **Balance, Analytical, Rueprecht**, in fine mahogany case, with beam 200 mm long; 200 grams capacity.

Sensibility, milligrams.....	0.1	.05
Duty Free.....	124.05	132.30
Duty Paid.....	171.75	183.15

21372. **Balance, Analytical, Rueprecht**, as above, but with shorter beam, i.e., 150 mm long; 200 grams capacity.

Sensibility, milligrams.....	0.1	.05
Duty Free.....	124.05	132.30
Duty Paid.....	171.75	183.15

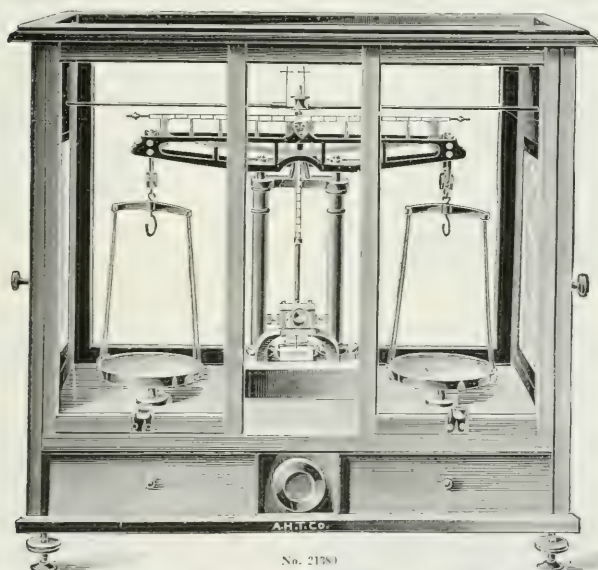
**Note**—Either of the above Balances can be furnished in case composed entirely of brass and mirror plate glass at an extra cost of \$35.85 duty free and \$49.60 duty paid.



No. 21376

21376. Balance, Technical-Analytical, Staudinger, a convenient balance for quick and exact weighings on the lecture table and for students' work. With beam and hangers of magnalium and agate bearings and knife edges. Case is of mahogany with sliding front door and base is of black marble.

Capacity, grams.....	100	200	500	1000
Sensibility, milligrams.....	0.5	1	2	3
Duty Free.....	29.35	32.95	39.70	44.70
Duty Paid.....	35.20	39.50	47.65	53.65

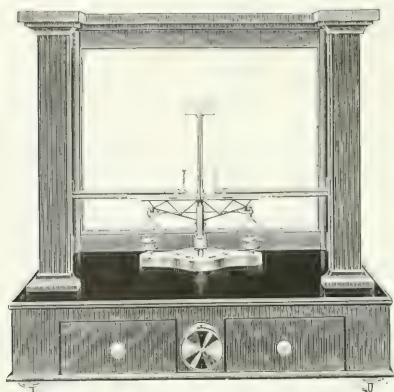


No. 21380

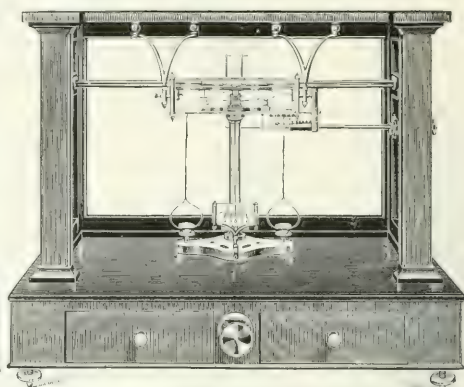
21380. Balance, Physical-Analytical, Staudinger. Recommended as a Balance of great precision with large carrying capacity. 1000 grams capacity, sensibility by means of reading microscope  $\frac{1}{10}$  milligram; with adjustment for sensibility, agate bearings throughout, Argentan beam 35 cm long, in fine mahogany case, with black mirror plate glass base.

Duty Free .....	255.00	Duty Paid .....	337.00
-----------------	--------	-----------------	--------





No. 21384



No. 21388

**21384. Balance, Assay, Ainsworth Inverted Type V, a reliable and widely used Assay Balance.**

**Sensitivity**—adjusted to a sensibility of 1-500 milligram and afterwards reduced to 1-200 milligram to increase the rapidity.

**Case**—of mahogany with counterpoised sliding door, 17 x 17 x 10 inches.

**Beam**—of hard rolled magnalium, 5 inches long.

**Edges and Bearings**—the end bearings are flat agate planes with suitable recesses for the engagement of agate contact points by means of which the bearings are raised from the edges when at rest.

**Rider Carrier**—of improved design with no metal surfaces in sliding contact and will operate smoothly and without lubrication under all conditions. The graduated scales divided in hundredths, each division representing 1-100 the weight of the rider used, are attached to the carrier. The rider carrier rod has a slight amount of end play in the sliding bushing which permits the withdrawal of the carrier from the eye of the rider without disturbing the reading, a greatly simplified construction.

**Release**—operates rapidly without causing the beam to kick, this being accomplished by first releasing the pan rests, then the end bearings and finally the beam, by means of a very simple mechanism not liable to derangement and which overcomes a serious defect in earlier balances of this type.

**Finish**—all metal parts are heavily gold plated and lacquered.

**Price**.....

300.00

**21388. Balance, Assay, Ainsworth Type C, with Improved Multiple Rider Carrier.** As used by leading assay-cr, smelters and mills where a large number of accurate weighings are to be made. The carrier can be attached to any of the other Ainsworth Balances. Each weight or rider has an individual arm, cannot be misplaced and can be operated with beam in motion. The numbers on the arms down indicate the weight of the riders on the beam and, when through weighing, all riders are reset simultaneously by a reverse movement of the thumbpiece.

**Sensitivity**—adjusted to a sensibility of 1-500 milligram and afterwards reduced to 1-200 milligram to increase the rapidity.

**Case**—of mahogany with counterpoised sliding door, 20 x 17 x 10 inches.

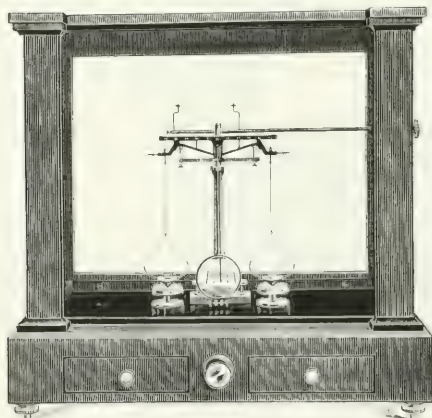
**Beam**—of truss form, with star adjustment, unobstructed on top, divided in 50 parts on either side of the center and read from 0 to the full weight of the rider used.

**Rider Carrier**—similar in construction to inverted type, No. 21384.

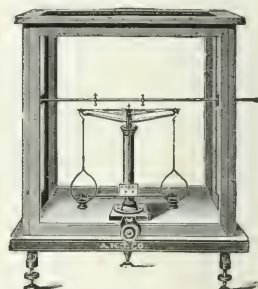
**Finish**—all metal parts are heavily gold plated.

**Price**.....

335.00



No. 21392



No. 21396

21392. **Balance, Assay, Troemner's New Form, No. 30.** This is an entirely new Balance designed to meet the demand for a low priced, short arm Balance with a sensibility of  $\frac{1}{100}$  milligram and of quick action. It requires but 13 seconds for one complete oscillation.

Sensibility—1-100 milligram.

Case—of well seasoned mahogany, French polished, with glass sides and top and with black plate glass sub-base; fitted with counterpoised sliding door and provided with a reading glass for the ivory index. 18 x 9½ x 18 inches.

Beam—of hard rolled aluminum alloy, graduated on both sides of the center knife edge into 50 divisions. The beam is unobstructed on top, so that the rider can be placed at any division on the beam, from 0 at the center to the last division on the beam, which is directly over the end knife-edge and represents the full weight of the rider used. With a 1 mg. rider on the one-half divisions, or a ½ mg. rider on the full divisions the Balance shows 1-100 mg. for each division on the ivory index.

Edges and Bearings—of Russian agate—accurately ground.

Rider Carrier—of single, double hook pattern, operated from right hand side of case with full, clear sweep across beam, and the rider, either single or double, can be placed at any division on the beam.

Finish—all the brass parts are covered with an impervious lacquer.

Price.....

125.00

21396. **Balance, Assay, Staudinger No. 22b.** This instrument is devised specially to meet the requirements of students' assay work in the U. S. at a low price. A large number of these instruments are now in use in this country, and no other balance of similar specifications is offered at a corresponding price.

Capacity—2 grams.

Sensibility—1-50 mg. but will easily show 1-100 mg.

Case—of mahogany.

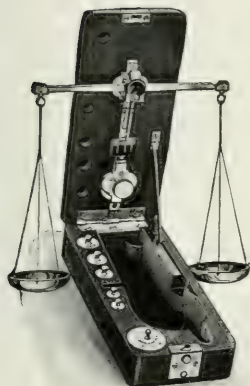
Beam—of magnesium, 200 mm long.

Knife Edges and Planes—of agate throughout.

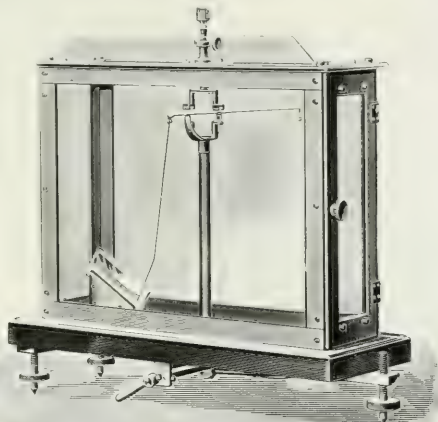
Release and Arrest—the arrestment of beam hangers and pans is accomplished quickly and conveniently.

Duty Free..... 36.00

Stock..... 50.00



No. 21400



No. 21401

21400. **Balance, Assay, Pocket.** Improved form with eccentric lift for beam. Size when closed is 6 x 2½ x 1½ inches. Capacity 10 grams; sensibility ¼ mg. Complete with set of weights. A half assay ton weight is usually supplied in place of the 10 gram piece..... 16.50



No. 21408

21404. **Balance, Micro, Nernst.** This Balance is based upon the torsion of a very fine quartz fibre and is used for weighing small crystals and for carrying on microchemical reactions with accurate observation of change in weight. The Balance is mounted securely and by means of proper arresting device may be shipped with reasonable safety. Full instructions for operation accompany each Balance. Capacity 10 mg; sensibility  $\frac{1}{1000}$  mg. See *Berichte der D. Chem. Gesellsch. Jahrg. XXXVI Heft 10 und Jahrg. XXXVIII Heft 1.*

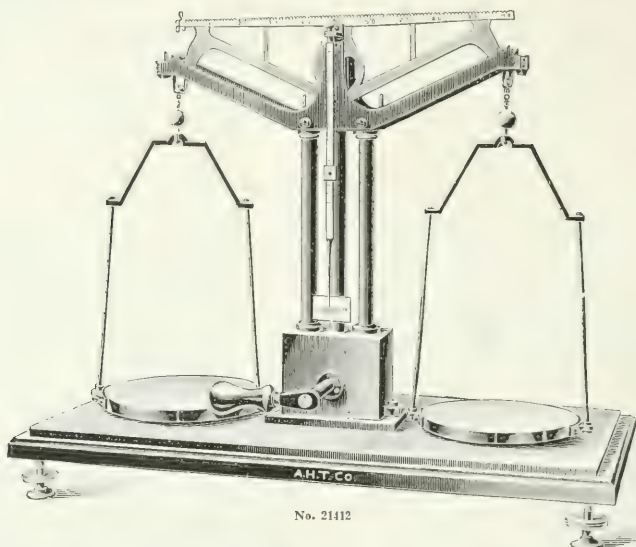
Duty Free..... 37.95

Duty Paid..... 43.70

21408. **Reading Microscope, Emich,** for use with above Nernst Balance, on adjustable stand, with counterpoise for the Microscope. See *Emich, Lehrbuch der Mikrochemie, Wiesbaden 1911.*

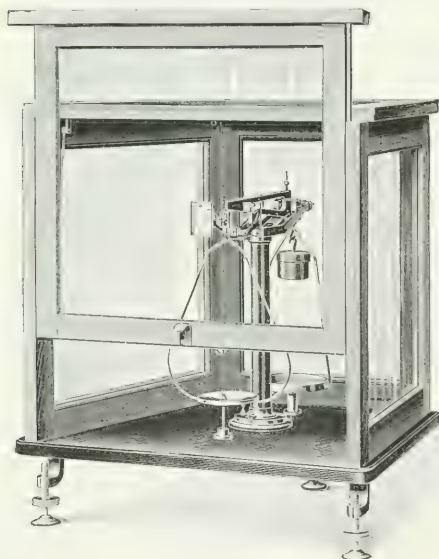
Duty Free..... 21.45

Duty Paid..... 28.60



No. 21412

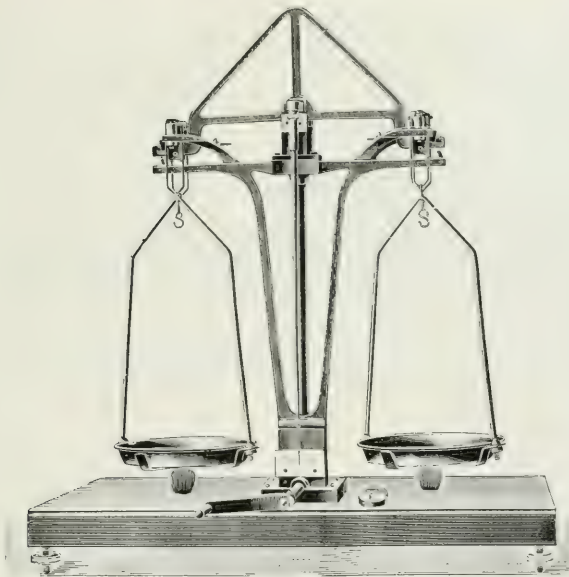
21412. Balance, Lecture Table, Staudinger, designed particularly for experiments where large carrying capacity is required; capacity 5000 grams, sensibility 1 centigram. Beam is divided into 100 equal divisions with zero at the left-hand side so that a 50 centigram platinum rider may be used with a value of 100 centigrams at the right-hand end of the beam. Beam is of bronze with agate bearings and planes, on heavy mahogany base; with levelling screws.
- |  |        |                |        |
|--|--------|----------------|--------|
| Duty Free.....   | 75.00  | Duty Paid..... | 105.00 |
| 21416. Balance, Lecture Table, as above, but with covering case of glass and mahogany. |        |                |        |
| Duty Free.....   | 105.00 | Duty Paid..... | 147.00 |



No. 21420

21420. Balance, Decimal, Mach, specially constructed for weighing precise quantities of substances for analysis, particularly in sugar, fertilizer and brewery laboratory practice or other work where large numbers of consecutive weighings of equal charges are to be made. The usual method is to use a scoop, counterpoised on the scale pan with lead shot placed in the circular box under the hangers at the short arm of the beam. If 20 grams of a substance is to be weighed, a 200 gram weight is placed in the rear of the short arm pan and the scoop on the front scale pan charged until the pointer comes to zero. Capacity 100 grams, sensibility 1° of scale = 1 milligram. Balance is furnished in mahogany case with metal parts heavily nickelled, suitable for use in the tropics and with base plate of polished mirror plate glass.
- |  |       |
|--|-------|
| Duty Free.....   | 25.90 |
| Duty Paid.....   | 34.50 |
| 21424. Balance, Decimal, Mach, as above but with pointer at the left-hand side instead of in front, and with side doors. |       |
| Duty Free.....   | 27.40 |
| Duty Paid.....   | 36.50 |





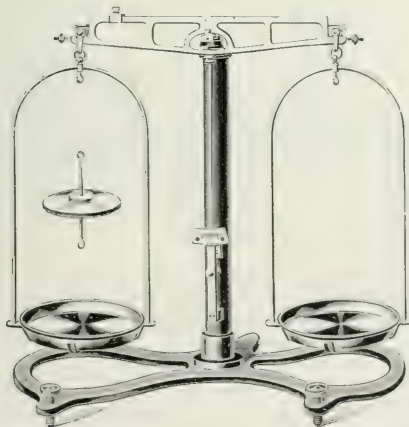
No. 21428

- 21428. Balance, Lecture Table**, for weighing large flasks and other containers and also for lecture table use; with adjusting arrangement for end knife edges; beam is of aluminum and support black enamelled. It should be noticed that this balance is frequently offered with an iron beam, in which case the sensibility is greatly diminished.

Capacity, kilos.....	1	5	10
Sensibility, mg.....	10	30	50
<b>Duty Free</b> .....	18.00	28.50	36.90
<b>Duty Paid</b> .....	21.60	34.25	44.30

- 21432. Balance, Lecture Table**, same as No. 21428 but in glass case with oak frame.

Capacity, kilos.....	1	5	10
Sensibility, mg.....	10	30	50
<b>Duty Free</b> .....	28.50	43.80	56.10
<b>Duty Paid</b> .....	34.25	52.60	67.35



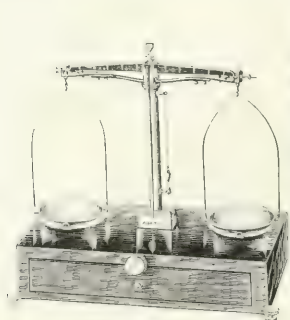
No. 21436

- 21436. Balance, Laboratory**, for school and lecture table work, with black enamelled iron base and pillar, with damping device for quick arrestment. The beam is of brass heavily nickel plated and divided into 100 parts and carrying a rider weighing up to 10 grams without weights. The bearings and knife edges are of hard high grade steel and the balance is supplied with levelling screws. Capacity 2 kilos, height of bows 35 cm, diameter of pans 14 cm, length of beam 32 cm, sensibility 20 milligram.

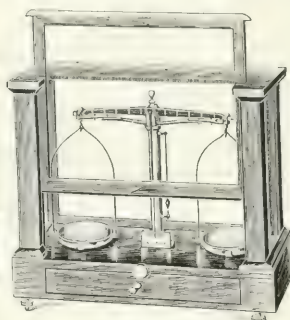
<b>Duty Free</b> .....	9.00
<b>Stock</b> .....	12.50

- 21440. Balance**, as above, but with agate knife edges.

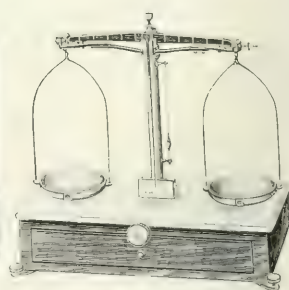
<b>Duty Free</b> .....	12.50
<b>Stock</b> .....	16.50



No. 21444

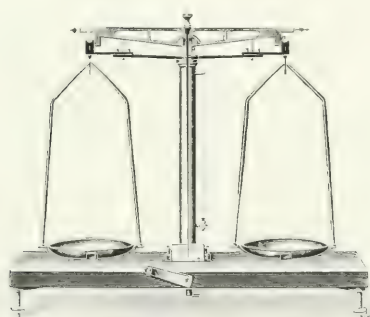


No. 21448

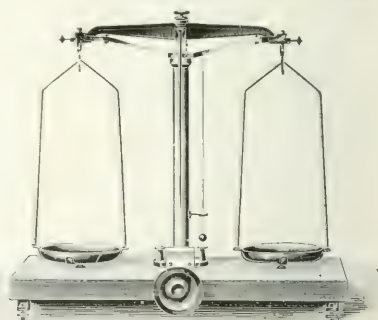


No. 21456

21444.	Balance, Pulp, for sugar, ore, pulp, etc., smaller sizes widely used as prescription scales, arresting device extends to hangers, knife edges and planes are of steel, on polished mahogany base with drawer and levelling screws. A very satisfactory and widely used balance.				
	Capacity, grams.....	75	180	300	600
	Sensibility, milligrams.....	1	1	2	2
	Diameter of pans, mm.....	65	80	100	125
	Each.....	12.00	16.00	20.00	26.50
21448.	Balance, Pulp, same as above in mahogany case, with sliding glass door.				
	Capacity, grams.....	75	180	300	600
	Each.....	22.00	25.00	33.00	38.00
21452.	Balance, Pulp, exactly the same as No. 21444, but with agate knife edges and planes and with circular spirit level instead of plumb bob.				
	Capacity, grams.....				100
	Sensibility, milligrams.....				1
	Each.....				22.50
21456.	Balance, Pulp, exactly same as No. 21452, but with marble top on the mahogany base.				
	Capacity, grams.....				250
	Each.....				20.00

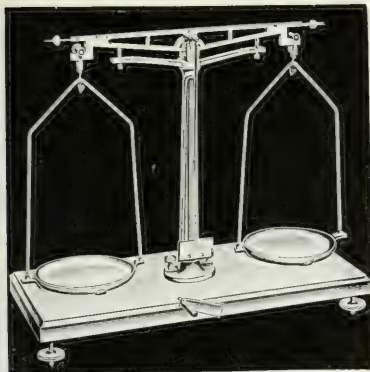


No. 21460

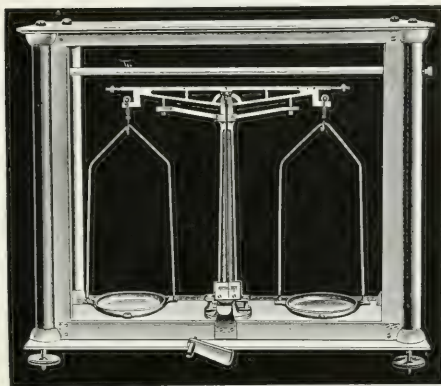


No. 21461

21460.	Balance, School Laboratory, with open beam, agate knife edges and planes, arrest for both beam and hangers, levelling screws and plumb bob, with divisions on beam for use of rider.		
	Capacity, grams.....	100	250
	Sensibility, milligrams.....	2	3
	Duty Free.....	10.00	12.00
	Stock.....	15.00	16.50
21464.	Balance, Staudinger School, with agate knife edges and planes, improved beam and hanger arresting device, on heavy wooden base with levelling screws, with removable pans. Recommended as the most accurate and satisfactory school laboratory balance of its type.		
	Capacity, grams.....	100	250
	Sensibility, milligrams.....	1	2
	Duty Free.....	12.00	13.50
	Stock.....	16.00	17.50



No. 21468



No. 21472

21468. **Balances, Magnalium.** Many so-called magnalium balances have only the beam, pillar and pans made of magnalium, the remaining parts being of brass. On this account they do not resist acid fumes much better than ordinary balances. **These balances are made entirely of magnalium insofar as the metal parts are concerned.** With agate knife edges and planes.

Capacity, grams.....	100	250
Sensibility, milligrams.....	3	5

**Duty Free.....** 10.00 12.50

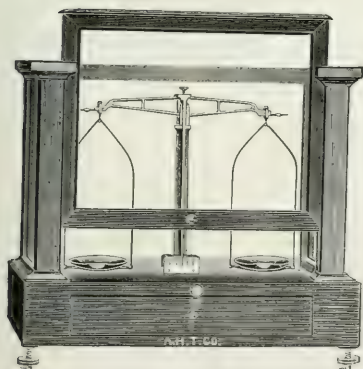
**Stock.....** 13.25 14.50

21472. **Balance, Magnalium,** same as above but in glass and magnalium case, and with rider carrier.

Capacity, grams.....	100	250
----------------------	-----	-----

**Duty Free.....** 26.10 27.90

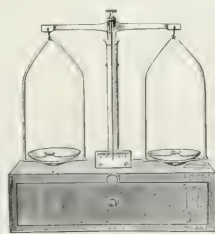
**Stock.....** 34.80 37.20



No. 21476



No. 21484



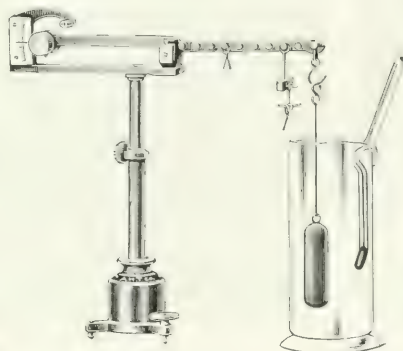
No. 21488

21476. **Balance, Laboratory,** for general laboratory work, open beam fitted with adjusting screws at both ends. The pans are 75 mm in diameter and nickel plated. Case is of polished mahogany with glass sides and top, sliding door, levelling screws and spirit level. Capacity 100 grams, sensitive to  $\frac{1}{2}$  mg. 25.00
21480. **Balance, Laboratory,** same as No. 21476 but with agate bearings..... 30.00
21484. **Balance, Prescription,** of brass with nickel plated pans 3 inches in diameter. Beam 9 inches long with adjusting screws. Sensibility 2 mg..... 9.00
21488. **Balance, Prescription,** of brass, on wooden base, with drawer. Beam 6 inches long, pans 3 inches in diameter. Without adjusting screws at end of beam. A useful Balance at a low price..... 6.00





No. 21492

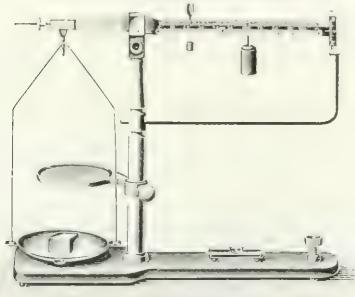


No. 21496



No. 21500

21492. Balance, Jolly Spiral Spring, with new patent reading scale. The inner tube can be adjusted up or down by means of the milled head and is graduated in millimeters with vernier reading to  $\frac{1}{10}$  mm. This Balance has been found very convenient in many industrial laboratories, such as in rubber works, for taking specific gravities. . . . . 25.00
21496. Balance, Specific Gravity, Sartorius, for both liquids and solids. This Balance is much superior to balances of the same type made by other manufacturers. The outfit includes Reimann's Plummet for liquids, pan for solid bodies, jar, special thermometer and rider weights reading to the fourth decimal place.
- |                                     |       |       |       |
|-------------------------------------|-------|-------|-------|
| Duty Free                           | 22.50 | Stock | 30.00 |
| Special Thermometer, only           |       | "     | 3.00  |
| Set of Riders, only                 |       | "     | 1.50  |
| Jar, only                           |       | "     | .30   |
| Reimann's Plummet, with thermometer |       | "     | .75   |
21500. Balance, Specific Gravity, Westphal. For the determination of the specific gravity of liquids up to the fourth decimal place. With jar, riders and Reimann's Plummet. . . . . 12.00
- |                         |      |
|-------------------------|------|
| Reimann's Plummet, only | 2.00 |
| Jar, only               | .30  |
| Set of Riders, only     | 1.50 |

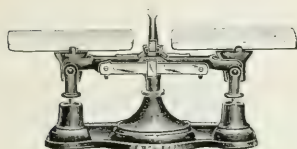


No. 21504



No. 21508

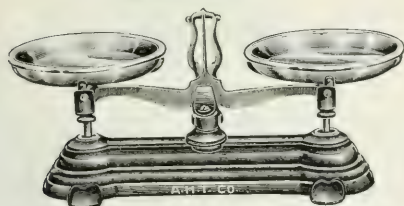
21504. Balance, Triple Beam, capacity 111 grams with a sensibility of  $\frac{1}{10}$  centigram. One beam reads from 10 grams to 100 grams in divisions of 10 grams, the second from 1 gram to 10 grams in divisions of 1 gram and the third from 1 gram to 1 gram in divisions of 1 centigram.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 11.50 | Stock | 15.00 |
|-----------|-------|-------|-------|
21508. Balance, Hand, with polished brass beam, steel knife edges, horn pans and silk cord.
- |                       |      |      |      |
|-----------------------|------|------|------|
| Length of beam, mm.   | 150  | 175  | 200  |
| Diameter of pans, mm. | 60   | 75   | 90   |
| Each                  | 1.50 | 1.75 | 2.00 |



No. 21512



No. 21521



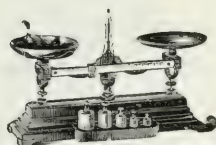
No. 21516



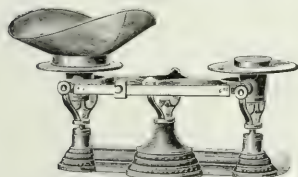
No. 21520



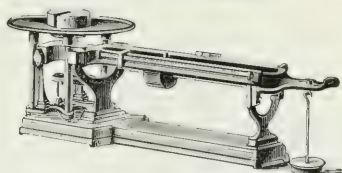
No. 21528



No. 21544

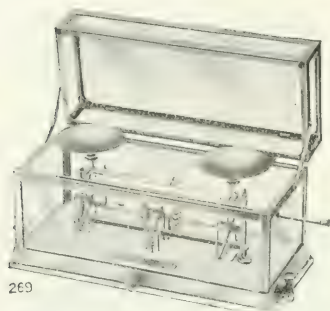


No. 21532

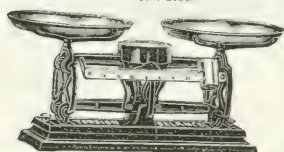


No. 21540

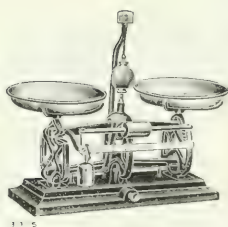
21512. **Balance, Harvard Trip**, with square or round porcelain plates 6 inches in diameter. Capacity 1 kilo, beam graduated up to 5 grams in  $\frac{1}{10}$  grams. 6.00
21516. **Balance, Robervahl**, for coarse weighing, with metal base and brass pans but without side beam.  
Capacity, kilos. 1 3 5 10  
Diameter of pans, mm. 125 150 200 225  
Each 2.80 3.60 4.50 6.00
21520. **Balance, Counter**, in ebony box with marble top and heavily nickel plated pans.  
Diameter of pans, inches. 7 8 9  
Capacity, lbs. 10 15 20  
Each 14.00 16.00 18.00
21524. **Balance, Troemner Trip**. A very substantial and reliable scale, with one heavy, brass pan which is removable. Ornamented in black and gold.  
Diameter of pans, inches. 8 9 12  
Capacity, lbs. 2 6 10  
Each 6.00 7.00 8.00
21528. **Balance, Prescription**. Very convenient in laboratory and pharmaceutical work. Pans 6 inches in diameter, heavily nickel plated. Capacity 500 grams in each pan, sensitive to 5 centigrams. Price includes full set of weights from 200 grams to 1 centigram, neatly fitted in base. 10.00
21532. **Balance, Moisture**, for determining the percentage of moisture in ores, etc. Beam is divided on the top into ounces and on the bottom into percentage of 100 to 0. Including a set of iron weights from 2 lbs. to  $\frac{1}{2}$  oz. Avoirdupois. 10.00
21540. **Balance, Solution**. With two weighing beams and sliding poises, one divided into 100 parts, each representing 1 gram; the other into 10 parts, each representing 100 grams. A bar with a sliding poise is placed under the weighing beams to balance the empty bottle or container, which is quickly done by sliding the poise along the bar. 25.00
21544. **Balance, New Dispensing**. Very convenient for rough prescription work or laboratory weighing. Pans  $3\frac{3}{4}$  inches in diameter, heavily nickel plated. Beam divided into decigrams. Capacity 100 grams. Including set of brass weights from 50 grams to 1 centigram, fitted into base. 9.00



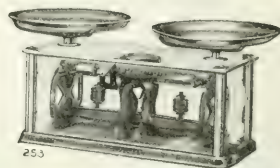
No. 21548



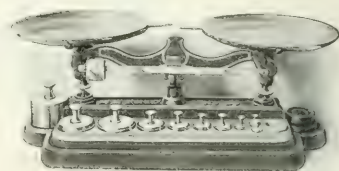
No. 21564



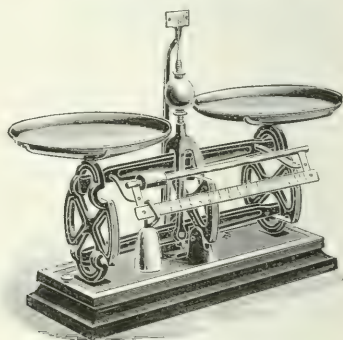
No. 21572



No. 21556



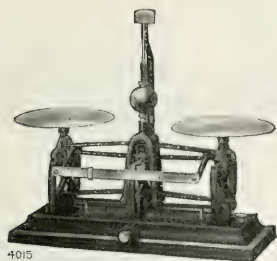
No. 21578



No. 21576

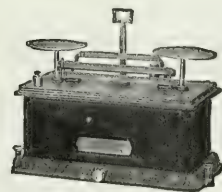
21548. Balance, Torsion, with glass case and cover and slide beam with rider carrier operating from outside. Capacity 125 grams in each pan, with beam reading to 500 milligrams by 5 milligrams; pans 7.5 cm in diameter; sensibility 1 milligram..... 40.00
21552. Hydrostatic Attachment, extra..... 10.00
21556. Balance, Torsion, with mechanism entirely enclosed in glass case with German silver corner posts and nickel plated base; nickel plated brass pans 23 cm in diameter. Capacity 4.5 kilos in each pan, beam reads to 100 grams by 1 gram, sensibility  $\frac{1}{2}$  gram. Rider on beam is manipulated from outside the case. With slide beam inside the case controlled by weight mover from the outside..... 35.00
21564. Balance, Torsion, with 9 inch beam and 6 inch nickel plated pans. Capacity 5 kilos. Beam divided to 300 grams in  $2\frac{1}{2}$  gram divisions. Sensitive to about 1 gram..... 13.50
21568. Arresting Device, extra..... 2.00
21572. Balance, Torsion, with tare weight. Bottles, dishes or other containers can be tared by sliding tare weight on upper beam, facilitating weighing and avoiding errors. Capacity 2.3 kilos in each pan, slide beam 100 grams by 1 gram, sensibility 7 centigrams, with nickel plated brass pans 15 cm diameter; with arresting device..... 20.00
21576. Balance, Torsion, similar to No. 21572 but of larger capacity, i. e., 4.5 kilos in each pan with a sensibility of 15 centigrams; pans 23 cm in diameter; with slide beam divided into 450 grams by 5 grams; with arresting device..... 22.00
21578. Balance, Solution, Metric. For rapidly making accurate reagents or other kind of composite solutions, with two movable brass pans. Price includes weights of solid brass. With side beam in front, undivided, for balancing the bottle or containers.
- |                               |                 |       |
|-------------------------------|-----------------|-------|
| Capacity, kilos.....          | 1               | 5     |
| Diameter of pans, inches..... | 5 $\frac{1}{2}$ | 9     |
| Each.....                     | 16.00           | 20.00 |





4015

No. 21580



1700

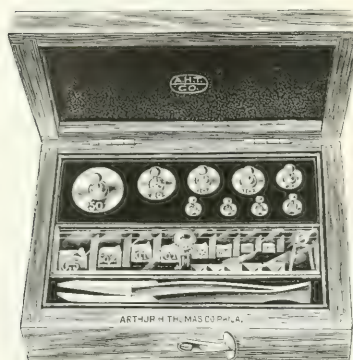
No. 21531

21580. **Balance, Torsion**, as recommended for soil analysis and as used in the U. S. Department of Agriculture. With slide beam divided in 10 grams by  $\frac{1}{10}$  gram; capacity 1 kilo in each pan; sensibility 7 centigrams; with porcelain plates 15 cm in diameter, high poise, indicator and arrest ..... 18.00
21584. **Balance, Torsion**, for moisture or subtraction tests. The scale is constructed with percentage beams so that 0.1% to 30% of moisture can be determined without calculation when 10 gram samples are used. By means of two tare beams one or more dishes can be balanced and recorded. As used in butter testing, paint and varnish testing laboratories, etc. With 10 gram weight.. 15.00



View in Stock Room Showing Arrangement of Porcelain Evaporating Dishes

# ANALYTICAL WEIGHTS



No. 21600

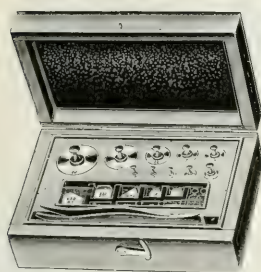


No. 21612

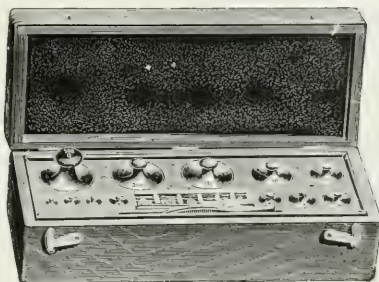
One piece Weights of Tobin bronze, made according to the designs of the Bureau of Standards, for use as Primary Standards, guaranteed to be within the tolerances established by the Bureau for Class A (new class M) are quoted upon application. Certificates for Analytical Weights of German manufacture such as No. 21600 are furnished from the Kaiserlichen Normal-Eichungs-Kommission of Berlin, as a matter of convenience.

21600.	Balance Weights, Analytical, with gram pieces heavily gold plated and with fractional pieces of platinum except the 1, 2 and 5 mg which are of aluminum and two 10 mg riders. In velvet lined, polished mahogany box, with ivory tipped forceps and fractional pieces covered by glass plate. These weights are adjusted with sufficient accuracy for the highest grade of analytical work.									
	Sets, 1 milligram to grams.....	20	50	100	200	500	1000			
	Duty Free, per set.....	7.15	8.00	9.50	12.15	15.00	18.50			
	Stock, per set.....	10.75	12.00	14.25	18.25					
21604.	Balance Weights, Analytical With Certificate, exactly the same as No. 21600 but with certificate of the Kaiserlichen Normal-Eichungs-Kommission of Berlin.									
	Sets, 1 milligram to grams.....	20	50	100	200	500	1000			
	Duty Free, per set.....	12.75	14.50	16.85	20.25	24.00	28.70			
	Stock, per set.....		22.15	26.00						
21608.	Balance Weights, Analytical, exactly similar to No. 21600 but with brass pieces carefully lacquered instead of gold plated. This set avoids the high duty on platinum and gold plated articles under the Tariff Act of 1913. By many experienced laboratory workers the lacquered finish is considered preferable to the gold plating.									
	Sets, 1 milligram to grams.....		50	100	200	500	1000			
	Duty Free, per set.....		6.85	8.00	10.50	13.00	16.25			
	Stock, per set.....		8.25	9.75						
21612.	Balance Weights, Analytical, Troemner, in mahogany block with removable cover, gram pieces carefully lacquered and fractionals of platinum and aluminum. With three 5 mg riders. Fractional pieces have one entire edge turned into vertical position for convenient handling with forceps.									
	Sets, 1 milligram to grams.....					50	100			
	Each.....						19.00	21.00		
21614.	Balance Weights, exactly as above but with Bureau of Standards Certificate.....						27.00	29.50		
21616.	Balance Weights, Analytical, Becker's Sons, Rotterdam, exactly similar in accuracy and finish to No. 21612 and mounted in similar case. This set can also be furnished with Bureau of Standards Certificate. With three 6 mg riders.									
	Sets, 1 milligram to grams.....						50	100		
	Duty Free, per set.....						8.50	9.60		
	Duty Paid, per set.....						14.00	16.00		
21620.	Balance Weights, Analytical, fractional sizes only. Same as those supplied in sets No. 21600 and adjusted to the same accuracy, 1, 2, and 5 milligram pieces of aluminum, larger pieces of platinum.									
	Size.....	1	2	5 milligrams	.01	.02	.05	.1	.2	.5 grams
	Each.....	.10	.10	.10	.25	.30	.45	.60	1.25	1.75
21624.	Balance Weights, Analytical. Single pieces of brass, gold plated. Same accuracy as supplied in sets No. 21600.									
	Size, grams.....	1	2	5	10	20	50	100		
	Each.....	.40	.45	.60	.70	.80	1.10	1.75		

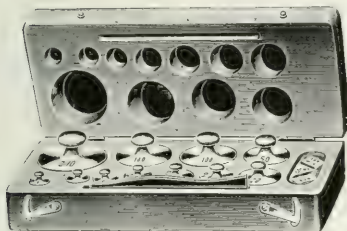
**Note** Riders of convenient shape and size for all standard Analytical Balances will be sent with our Analytical Weights from stock if customer will please specify make and type of Balance in ordering the Weights.



No. 21628



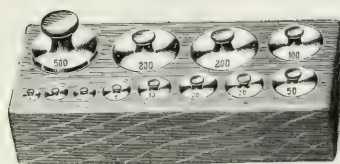
No. 21644



No. 21618



No. 21632



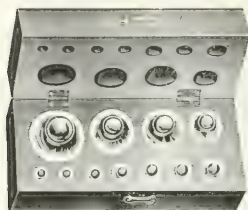
No. 21656

21628. **Balance Weights, Analytical**, with gram pieces nickel plated and fractionals of German silver. A good set for students' analytical work, the sets being accurately adjusted. In mahogany case with forceps. Sets, 1 milligram to grams..... 50 100  
**Per set**..... 5.00 6.50
21632. **Balance Weights, Standard, for sugar analysis.**  
 Size, grams..... 13.024 26.048 52.096  
**Each**..... .80 .90 1.00
21636. **Balance Weights, Standard, for sugar analysis**, set of three same as No. 21632, in mahogany box with lid..... 4.00
21640. **Balance Weights, Assay Ton.** Accurately adjusted to the standard of 29.166 grams to the ton. Set from 4 A. T. to  $\frac{1}{10}$  A. T..... 6.00

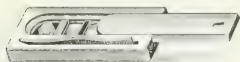
# WEIGHTS OF MEDIUM ACCURACY

21644. **Balance Weights, of medium accuracy.** Gram pieces are nickel plated, fractionals of aluminum, in polished box, with forceps. A very reliable set for ordinary laboratory routine.  
 Sets, 1 milligram to grams..... 20 50 100 200 500 1000  
**Per set**..... 2.50 3.25 3.75 5.00 6.75 9.50
21648. **Balance Weights, of medium accuracy, of lacquered brass.** A very useful set for laboratory work. Fractionals are of German silver. In polished case with lid and forceps.  
 Sets, 100 milligrams to grams..... 20 50 100 200 500 1000  
**Per set**..... 1.25 1.50 2.00 3.00 4.25 6.50
21652. **Balance Weights, of medium accuracy, Troemner make.** In cherry block, weights all solid brass with small pieces of nickel. A very reliable and popular set.  
 Sets, 1 centigram to grams..... 20 50 100 200 500 1000  
**Per set**..... 1.10 1.25 1.75 2.50 4.00 6.50
21656. **Balance Weights, of medium accuracy, in polished block, without lid, and without fractionals or forceps.**  
 Sets, 1 gram to grams..... 50 100 200 500 1000  
**Per set**..... .90 1.25 1.80 3.50 5.00





No. 21660



No. 21668



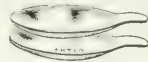
No. 21676



No. 21680



No. 21708



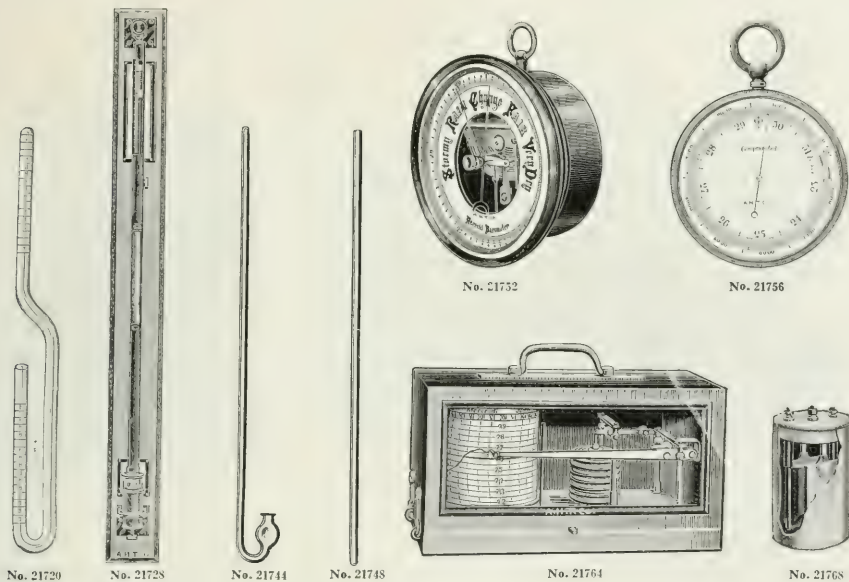
No. 21684

No. 21696

No. 21704

No. 21712

- |        |   |             |             |             |             |             |             |  |
|--------|---|-------------|-------------|-------------|-------------|-------------|-------------|--|
| 21660. | <b>Balance Weights</b> , of brass in walnut box. These weights are roughly finished and are of ordinary accuracy but are very suitable for students' work.<br>Sets, 10 milligrams to grams.....   |             |             |             |             |             |             |  |
|        | Per set.....  | .90         |             | 1.25        | 1.80        | 3.00        | 4.75        |  |
| 21664. | <b>Balance Weights</b> , single fractional sizes only of aluminum. Same quality as weights in sets No. 21644.<br>Size, milligrams.....  |             |             |             |             |             |             |  |
|        | Each.....   | .10 .10 .10 | .15 .18 .18 | .18 .18 .18 | .18 .18 .18 | .18 .18 .18 | .18 .18 .18 |  |
| 21668. | <b>Balance Weights</b> , of aluminum, fractionals only. Same quality as No. 21644 but in set of from 1 milli-gram to .5 gram. In mahogany box, with forceps.....  |             |             |             |             |             |             |  |
| 21672. | <b>Balance Weights</b> , single fractional sizes only, of aluminum, same quality as No. 21648.<br>Size, milligrams.....   |             |             |             |             |             |             |  |
|        | Each.....   | .05 .05 .05 | .05 .05 .05 | .05 .05 .05 | .05 .05 .05 | .05 .05 .05 | .05 .05 .05 |  |
| 21676. | <b>Balance Weights</b> , of iron, for coarse weighing.<br>Sets, 10 grams to kilos.....  |             |             |             |             |             |             |  |
|        | Per set.....  |             | 1           | 2           | 5           | 10          |             |  |
| 21680. | <b>Balance Weights</b> , Avoirdupois, of sealed iron, for coarse weighing.<br>Sets, $\frac{1}{2}$ oz. to lbs.....   |             |             |             |             |             |             |  |
|        | Per set.....  |             | .50         | .85         | 1.25        | 2.25        |             |  |
| 21684. | <b>Balance Weights</b> , Avoirdupois, Troemner make, of nickel silver. Set from $\frac{1}{4}$ oz. to $1\frac{13}{16}$ oz.....   |             |             |             |             |             |             |  |
| 21688. | “ “ “ “ concave, of aluminum. Set from $\frac{1}{2}$ grain to 10 grains .40   |             |             |             |             |             |             |  |
| 21692. | <b>Balance Cover</b> , of rubber sheeting, to order to fit balances as per size which must be given with order. Affording a very convenient and satisfactory protection to the balances in the laboratory..   |             |             |             |             |             |             |  |
| 21696. | <b>Balance Riders</b> , of aluminum, carefully adjusted.<br>Size, milligrams.....   |             |             |             |             |             |             |  |
|        | Each.....   | .15 .15     | .15 .15     | .15 .15     | .15 .15     | .15 .15     | .15 .15     |  |
| 21700. | <b>Balance Riders</b> , same as No. 21696 but of platinum.<br>Size, milligrams.....   |             |             |             |             |             |             |  |
|        | Each.....   |             |             | .50         | .50         | .50         |             |  |
| Note.  | In ordering Riders kindly specify make and type of Balance on which they are to be used and they will be sent of proper shape to fit beam without bending.  |             |             |             |             |             |             |  |
| 21704. | <b>Balance Pans</b> , of glass, with handle.<br>Diameter, inches.....   |             |             |             |             |             |             |  |
|        | Per pair.....   |             |             | .75         | .75         | .75         |             |  |
| 21708. | <b>Balance Reading Glass</b> . A lens with cylindrical curves instead of spherical permitting the reading of the entire scale of any ordinary analytical balance, with both eyes. On heavy base, with adjustable joint and extra handle so that same may be used as a hand glass when necessary. .450 |             |             |             |             |             |             |  |
| 21712  | <b>Balance Rests</b> , of glass, for use under the levelling screws of balances. Each.....  |             |             |             |             |             |             |  |
|        |   |             |             |             |             |             | .10         |  |



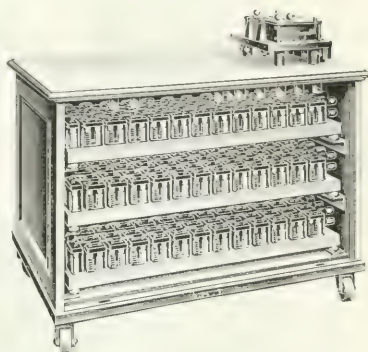
21716.	Balloons, of collodion for collecting hydrogen and other gases. Length, inches.....	6 .50	.12 .85	16 1.10
21720.	Barometer, Bunsen's, tube only, graduated in millimeters.			3.00
21724.	" Same as No. 21720 but filled with mercury.			10.00
21728.	" Observatory, U. S. Weather Bureau pattern. Furnished with scale divided either to inch and vernier reading to . <sup>1</sup> / <sub>100</sub> inch or graduated in millimeters and reading by vernier to mm. Mounted on polished mahogany board with white glass background to facilitate reading. With thermometer.			37.50
21732.	Barometer, same as No. 21728 but without mahogany board.			32.00
21736.	" " " " " " with both millimeter and inch scales. On mahogany board.			42.50
21740.	" " " " " " Without mahogany board.			37.00
21744.	Barometer Tube, bent, with bulb, closed at one end.			.40
21748.	" " straight, closed at one end.			.35
21752.	Barometer, Aneroid, with open porcelain dial showing internal arrangement, 5 inches in diameter in brass case.			8.00
21756.	Barometer, Aneroid, watch form for the pocket, 2½ inches in diameter, in gilded metal mounting and morocco carrying case. Compensated for temperature and with revolving altitude scale reading to 8000 ft.			20.50
21760.	Barometer, same as No. 21756 but with revolving altitude scale reading to 16,000 ft.			24.00
21764.	Barometer, Richard, Recording. Divisions of chart equal 1 mm of mercury. Each chart equals seven days of time. In metal and glass case, 18 x 12 x 11 cm.			27.00
	Duty Free.....	22.00	Stock.....	36.00
	Charts, for use with above.			
	Duty Free, per 100.....	2.50	Stock.....	3.25
21768.	Battery, Edison Primary. These batteries, formerly known as Edison-Laland, are unequalled for closed circuit work. They have a mean working E. M. F. of .667 volts per cell. When working continuously it is not advisable to take over 1½ amperes from the "BB" type, 2½ amperes from the "Q" type and 6 amperes from the "S" type.			
	Type.....	"BB"	"Q"	"S"
	Size, inches.....	4½ x 7¾	5½ x 8¾	5½ x 13
	Capacity, ampere hours.....	100	150	300
	Complete in porcelain jar.....	1.50	2.20	3.00
	Complete renewal.....	.72	.82	1.46
	The following is the itemized cost of the parts necessary for one charge in renewing the batteries.			
	Copper Oxide Plates.....	24	31	.62
	Zinc Plates.....	.28	.28	.50
	Caustic Soda.....	.15	.17	.28
	Paraffine Oil.....	.05	.06	.06



No. 21772



No. 21776



No. 21780



No. 21784, Type E3.

# 21772. Battery, Grenet, original French make.

Capacity, liters.....	$\frac{3}{2}$	1	2
Complete.....	2.00	2.75	4.00
Carbon, for renewal.....	.50	.80	.90
Zinc " ".....	.20	.25	.30

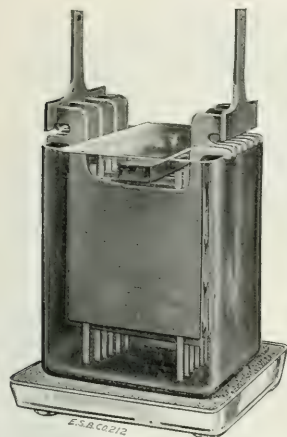
# 21776. Battery, Dry, an open circuit battery of high efficiency, 7 x 2½ inches.

# 21780. Battery, Storage, Model of the Physikalisch-Technische Reichsanstalt, Type U. These cells are 32 x 30 x 80 mm high, with sealed in porcelain lid and arrangement to permit the outlet of gases through fine glass wool. The cells have an E. M. F. of 2 volts each and have a capacity of .8 ampere hours at the normal discharge rate of $\frac{1}{10}$ ampere, or 2 ampere hours at a discharge rate of $\frac{1}{100}$ ampere. They are widely used for physical measurements, the testing of ammeters, voltmeters and other electrical measuring instruments, and have been found useful in many kinds of laboratory work where a great variation in E. M. F. is required. The cells are furnished singly for mounting in the laboratory or mounted up on base boards with connections, in batteries of from 10 to 100 cells; in portable cases, with switch board and lid, in batteries of 20 to 100 cells; and in portable cabinets in batteries of from 120 to 400 cells. Prices on application.

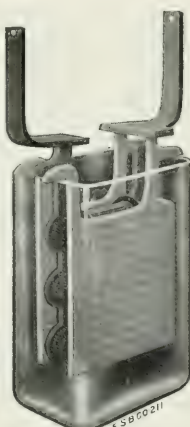
# 21784. Battery, "Chloride Accumulator," Portable Type. Portable batteries are shipped filled with electrolyte and charged ready for service. While the greatest care is used in packing, it is almost impossible to avoid damage to cells of this type shipped by freight. For short distances it is, therefore, recommended that shipment of the portable type be made by express. Where distance is great it is recommended that electrolyte be forwarded separately as in the case of regular batteries. Each cell when discharging gives approximately 2 volts and, as the cells in each case are connected in series, the number of cells multiplied by 2 will give the approximate voltage between the two outside connectors of each case. The normal charge rate is the highest rate in amperes at which the battery should be charged. At this rate a battery will be fully charged in nine hours and discharged in eight hours.

Number of cells in case....	1	2	3	4	5	1	2	3	4	5	1
Type and No. of plates....	C3	C3	C3	C3	C3	D3	D3	D3	D3	D3	D5
Normal charge rate, amp....	1½	1½	1½	1½	1½	2½	2½	2½	2½	2½	5
Weight, pounds.....	8	14	20	26	32	15	26	37	48	59	24
Price, complete charged.....	5.00	9.00	12.50	16.00	19.00	6.50	12.00	16.50	21.00	25.00	10.00
Number of cells in case.....	2	3	4	5	1	2	3	4	5	1	
Type and No. of plates.....	D5	D5	D5	D5	D7	D7	D7	D7	D7	D7	E5
Normal charge rate, amp.....	5	5	5	5	7½	7½	7½	7½	7½	7½	10
Weight, pounds.....	43	62	81	100	33	58	83	108	133	158	
Price, complete charged.....	18.00	26.00	32.00	38.00	12.00	22.00	30.00	40.00	50.00	60.00	14.50
Number of cells in case.....	2	3	4	5	1	2	3	4	5	1	
Type and No. of plates.....	E5	E5	E5	E5	E7	E7	E7	E7	E7	E9	E11
Normal charge rate, amp.....	10	10	10	10	15	15	15	15	15	20	25
Weight, pounds.....	60	86½	113½	140	42½	82½	122½	163	204	245	
Price, complete charged.....	28.00	40.00	50.00	60.00	18.00	35.00	50.00	65.00	80.00	95.00	25.00

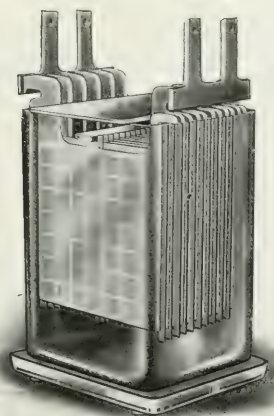




No. 21788. Type D7



No. 21788. Type C3



No. 21788. Type F11

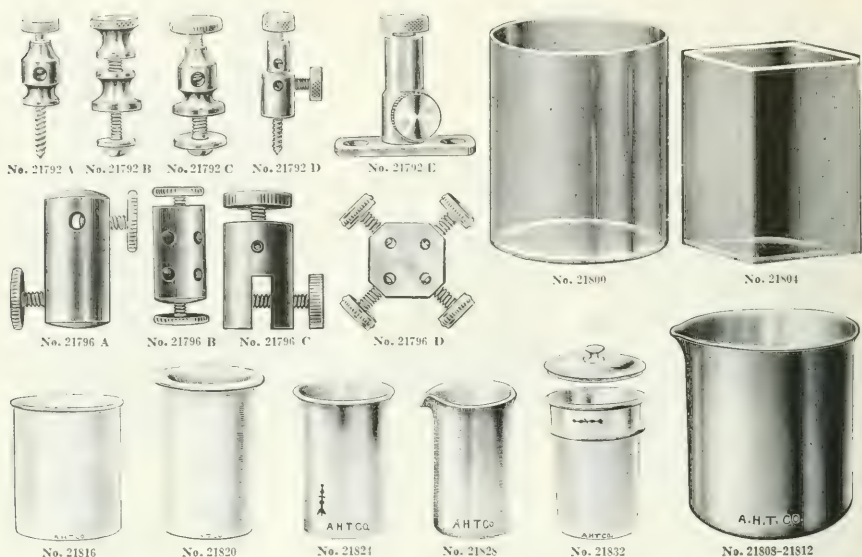
**21788. Battery, "Chloride Accumulator,"** the most widely used form of storage battery. The voltage of cells of all capacities is slightly over 2 volts on open circuit and, during discharge at the 8 hour rate, varies from that point at the beginning to 1.75 volts at the end. Electrolyte is shipped in carboys, for each of which a charge of \$2.00 net is made and an extra charge of 5c for caps when required. Credit will be allowed in full for these carboys when returned in good condition and charges prepaid. The following net charges are made for casing and packing.

"B," "LT" and "BT" elements, each.....	.02
"C" and "CT" elements, each.....	.04
"D," "PT" and "ET" elements, each.....	.10
"E" elements, each.....	.15
"F" elements, each.....	.25
Rubber Jars, each.....	.05
No charge for packing Glass Jars.	

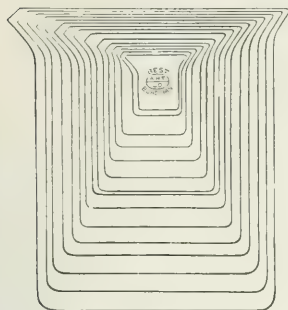
Type.....	LT	BT	CT	PT	ET	B	C				D	
Size of plate, inches.....	3½ x 1	4 x 3	5 x 5	8½ x 5	7½ x 7½	3 x 3	4½ x 4	4½ x 4	4½ x 4	4½ x 4	6 x 6	6 x 6
Number of plates.....	2	2	2	2	2	3	3	5	7	3	3	5
Discharge in { 8 hours.....	2	2	1½	3	4½	1½	2½	3½	3½	2½	3	5
amperes for... { 5 ".....	4	4	2	4½	6½	1½	3½	5	5½	3½	5	7
3 ".....	2	1½	3	6	9	1½	2½	5	7½	5	10	5
Normal charge rate.....	½	¾	1½	3	4½	1½	2½	3½	3½	2½	3	5
Price, element only.....	.60	.90	1.75	2.60	3.50	1.50	2.25	3.50	5.00	3.25	5.00	
Price, glass jar only.....	.20	.25	.50	.75	.95	.17	.30	.35	.45	.85	1.00	
Price, glass cover only.....		.12	.14	.14	.30							
Price, rubber jar and cover.....		.65	1.10	1.75	2.05	.65	.95	1.15	1.40	1.45	1.70	

Type.....	D						E					
Size of plates, inches.....	6 x 6	6 x 6	6 x 6	6 x 6	7½ x 7½	7½ x 7½	7½ x 7½	7½ x 7½	7½ x 7½	7½ x 7½	7½ x 7½	7½ x 7½
Number of Plates.....	7	9	11	13	5	7	9	11	13	15	17	19
Discharge in { 8 hours.....	7½	10	12½	15	10	15	20	25	30	35	40	45
amperes for... { 5 ".....	10½	14	17½	21	14	21	28	35	42	49	56	63
3 ".....	15	20	25	30	20	30	40	50	60	70	80	90
Normal charge rate.....	7½	10	12½	15	10	15	20	25	30	35	40	45
Price of element only.....	6.75	8.50	10.25	12.00	8.25	11.75	15.25	18.75	22.25	25.75	29.25	32.75
Price of glass jar, only.....	1.35	1.70	1.70	2.55	1.50	1.70	1.85	2.05	2.90	3.40	3.90	4.40

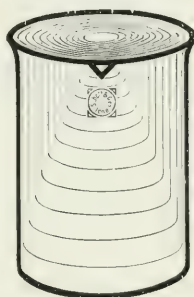
Type.....	F											
Size of plates, inches.....	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½	11 x 10½
Number of plates.....	9	11	13	15	17	19	21	23	25	27	29	31
Discharge in { 8 hours.....	40	50	60	70	80	90	100	110	120	130	140	150
amperes for... { 5 ".....	56	70	84	98	112	126	140	154	168	182	196	210
3 ".....	80	100	120	140	160	180	200	220	240	260	280	300
1 ".....	160	200	240	280	320	360	400	440	480	520	560	600
Normal charge rate.....	40	50	60	70	80	90	100	110	120	130	140	150
Price of element only.....	30.00	37.50	45.00	52.50	60.00	67.50	75.00	82.50	90.00	97.50	105.00	112.50
Price of glass jar A only.....	4.40	5.05	5.05	6.25								



No.	Description	Style				
		A	B	C	D	E
21792.	Battery Binding Posts, of brass.					
	Each.....	.10	.07	.10	.20	.25
21796.	Battery Connectors.					
	Each.....	.35	.25	.25	.20	.20
21800.	Battery Jars, cylindrical, white glass, hand made.					
	Diameter, inches.....	4	4½	4	5	6
	Height, inches.....	4	4½	5	7	8
	Number in original package.....	60	48	48	30	24
	Each.....	.20	.25	.25	.50	.65
	Per dozen, in original package.....	1.45	1.65	1.80	2.75	3.30
21804.	Battery Jars, square form, with ground top. These are packed six dozen in a case.					
	Length, inches.....		3½	4	4½	5
	Width, inches.....		3½	4	4½	5
	Height, inches.....		5	8	6	4
	Each.....	.20	.30	.25	.20	.20
	Per dozen, in original package.....	1.05	1.50	1.40	1.05	1.05
21808.	Beakers, Aluminum, with spout. Capacity, cc.....	60	120	250	500	1000
	Each.....	.30	.50	.70	1.00	1.40
21812.	Beakers, Copper, with spout. Capacity, cc.....	125	250	500	1000	2000
	Each.....	.55	.75	.90	1.20	3.00
21816.	Beakers, Enamel Ware, of seamless steel, white enameled, both acid and fire proof. Very convenient for many purposes in the laboratory and especially for culture tubes during incubation.					
	Capacity, cc.....	300	450	650	900	900
	Height, mm.....	90	100	110	120	120
	Diameter, mm.....	75	85	95	100	100
	Each.....	.30	.35	.45	.55	.55
21820.	Beaker, Enamel Ware, of seamless steel, white enameled, both acid and fire proof, with flat, well extended lip; 140 mm high by 70 mm inside diameter. Made especially for and widely used in the dyeing industry. Capacity 500 cc.....					.50
21824.	Beakers, Royal Berlin Porcelain, glazed inside and outside, without spout. Widely used in the testing of dye-stuffs, etc.					
	Capacity, cc.....	340	580	800	970	1500
	Each.....	.90	1.08	1.35	1.50	2.10
21828.	Beakers, "Sanitäts" Porcelain, glazed inside and outside, with spout.					
	Capacity, cc.....	325	500	1000		
	Each.....	.50	.75	1.25		
21832.	Beaker, Royal Berlin Porcelain (Dye Pot), glazed on the inside entirely and on the outside down to the heavy ring for supporting same in water bath. Below the ring the beaker is unglazed; without lid; 165 mm high, 132 mm diameter at top, capacity 1460 cc.....					2.70
21836.	Lid, Royal Berlin Porcelain, for above beaker.....					.50



No. 21840



No. 21848



No. 21852

**NOTE**—Our "Best Bohemian" beakers Nos. 21840, 21844, 21860, 21864 and 21868 are offered as being the highest product of the Bohemian factories. They are selected after the most exhaustive chemical and physical tests made in Philadelphia under our own direction and are distinctly superior in shape, finish and resistance properties to German made beakers, with the exception of the products of Schott & Gen at Jena. We do not list or stock German beakers but can supply them on duty free orders at somewhat less price than our "Best Bohemian."

- 21840. Beakers, Best Bohemian Glass, Griffin's low form, with spout.** This is our standard beaker and widely used in both educational and industrial laboratories. They are selected with special care as to shape and quality and are recommended as a most satisfactory beaker for routine work.

Number.....	000	00	0	1	2	3	4
Capacity, cc.....	20	40	100	150	250	350	500
Each.....	.07	.08	.10	.12	.15	.20	.25
Number.....	5	6	7	8	9	10	12
Capacity, cc.....	670	950	1250	1750	2400	3000	4500
Each.....	.35	.45	.55	.70	.80	.95	1.10

- 21844. Beakers, Best Bohemian Glass, Griffin's low form, without spout.** Otherwise same as above.

Number.....	000	00	0	1	2	3	4
Capacity, cc.....	20	40	100	150	250	350	500
Each.....	.07	.08	.10	.12	.15	.20	.25
Number.....	5	6	7	8	9	10	12
Capacity, cc.....	670	950	1250	1750	2400	3000	4500
Each.....	.35	.45	.55	.70	.80	.95	1.10

- 21848. Beakers, New Jena Glass, Griffin's low form, with spout.** The standard beaker for analytical work throughout the civilized world.

Capacity, cc.....	50	100	150	250	400	600
Each.....	.12	.13	.15	.17	.24	.29
Capacity, cc.....	800	1000	1300	1500	2000	2500
Each.....	.34	.39	.47	.53	.60	.68

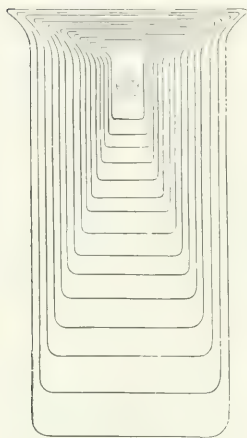
- 21852. Beakers, Whitall Tatum Nonsol Glass, Griffin's low form, with spout.** Extremely resistant to temperature change. Very insoluble in water, acids and alkalies and especially recommended for their uniformity of shape. By special arrangement we offer these Beakers for immediate shipment from our own stock at manufacturer's original net prices.

Capacity, cc.....	30	60	90	120	150	180
Each.....	.12	.12	.13	.14	.15	.15
Capacity, cc.....	250	300	350	500	600	700
Each.....	.17	.18	.20	.25	.28	.30

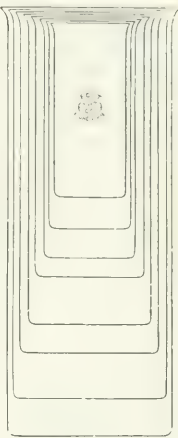
- 21856. Beakers, Whitall Tatum Regular Glass, Griffin's low form with spout; widely used in industrial laboratories because of their uniform shape and high quality of the glass. Exactly similar in shape to No. 21852. By special arrangement we offer these Beakers for immediate shipment from our stock at manufacturers original net factory prices.**

Capacity, cc.....	30	60	90	120	150	180	250	300
Each.....	.09	.09	.10	.11	.11	.12	.12	.14
Capacity, cc.....	350	500	600	700	1000	1400	2000	
Each.....	.16	.19	.20	.23	.35	.43	.55	

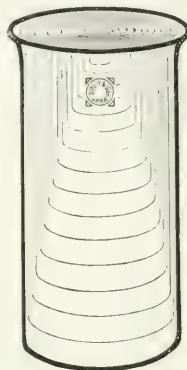




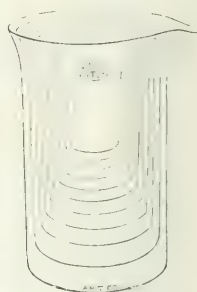
No. 21860



No. 21868



No. 21872



No. 21880

21860.	Beakers, Best Bohemian Glass, usual or Berzelius form, without spout.					Same quality as No. 21840.							
	Number.....	000	00	0	1	2	3	4					
	Capacity, cc.....	15	30	45	75	110	170	250					
	Each.....	.06	.07	.08	.10	.12	.15	.18					
	Number.....	5	6	7	8	9	10	11	12				
	Capacity, cc.....	380	580	800	1150	1750	2250	2800	3700				
	Each.....	.22	.28	.35	.40	.55	.65	.75	.90				
21864.	Beakers, Best Bohemian Glass, usual or Berzelius form, with spout.					Same quality as No. 21840.							
	Number.....	000	00	0	1	2	3	4					
	Capacity, cc.....	15	30	45	75	110	170	250					
	Each.....	.06	.07	.08	.10	.12	.15	.18					
	Number.....	5	6	7	8	9	10	11	12				
	Capacity, cc.....	380	580	800	1150	1750	2250	2800	3700				
	Each.....	.22	.28	.35	.40	.55	.65	.75	.90				
21868.	Beakers, Best Bohemian Glass, extra tall form, without spout.					Convenient for lecture table.							
	Capacity, cc.....	150	250	350	500	750	1200	1800	2400				
	Each.....	.15	.20	.25	.30	.35	.45	.50	.60				
21872.	Beakers, New Jena Glass, usual or Berzelius form, without spout.												
	Capacity, cc.....	50	100	150	200	300	400	500	600				
	Each.....	.12	.13	.15	.17	.21	.24	.26	.29				
	Capacity, cc.....	800	1000	1300	1500	2000	2500	3000	4000				
	Each.....	.32	.37	.42	.45	.53	.63	.73	.85				
21876.	Beakers, New Jena Glass, usual or Berzelius form, with spout.												
	Capacity, cc.....	50	100	150	200	300	400	500	600				
	Each.....	.12	.13	.15	.17	.21	.24	.26	.29				
	Capacity, cc.....	800	1000	1300	1500	2000	2500	3000	4000				
	Each.....	.32	.37	.42	.45	.53	.63	.73	.85				
21880.	Beakers, Whitall Tatum Nonsol Glass, usual form, with spout. Extremely resistant to temperature change. Very insoluble in water, acids and alkalis and especially recommended for their uniformity of shape. By special arrangement we offer these Beakers for immediate shipment from our own stock at manufacturer's original net prices.												
	Capacity, cc.....	60	90	120	180	250	300	350	500	700	1000		
	Each.....	.12	.13	.14	.15	.17	.18	.20	.25	.30	.45		
21884.	Beakers, Whitall Tatum Regular Glass, tall form, with spout. Extremely resistant to temperature changes. Very insoluble in water, acids and alkalis and especially recommended for their uniformity of shape. By special arrangement we offer these beakers for immediate shipment from our own stock at manufacturer's original net prices.												
	Capacity, cc.....	30	60	90	120	180	250	300	350	500	700	1000	
	Each.....	.09	.09	.10	.11	.12	.13	.14	.16	.19	.23	.35	.45
	Capacity, cc.....	300	350	500	700	1000	1200	1500	2000	2500	3000	4000	
	Each.....	.14	.16	.19	.23	.35	.45	.55	.65	.75	.85	.95	



No. 21888



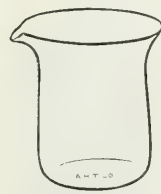
No. 21892



No. 21900



No. 21904



No. 21912

21888.	Beakers, New Jena Glass, slender conical form, with spout.						
	Capacity, cc.....	50	100	150	250	500	1000
	Each.....	.12	.13	.15	.17	.26	.38
21892.	Beakers, New Jena Glass, wide conical form, without spout.						
	Capacity, cc.....	50	100	150	250	500	1000
	Each.....	.12	.13	.15	.17	.26	.38
21896.	Beakers, Phillips, conical shape, without spout.						
	Capacity, cc.....		100	250	500	750	1000
	Each.....		.10	.15	.25	.30	.40
21900.	Beakers, Phillips, conical shape, with spout.						
	Capacity, cc.....		100	250	500	750	1000
	Each.....			.18	.22	.30	.45
21904.	Beakers, tumbler form, of heavy molded glass. Not intended to stand heat; capacity 7 oz.....						.10
21908.	Beakers, Heavy Glass, low wide form with spout, convenient for many purposes for which the ordinary thin boiling beaker is not suitable.						
	Capacity, cc.....	100	250	400	750	1000	2000
	Each.....	.20	.24	.35	.50	.60	.85
21912.	Beaker, Heavy Glass, with wide flaring lip and spout, as used in sugar analysis.						
	Capacity, cc.....					175	900
	Each.....					.20	.40



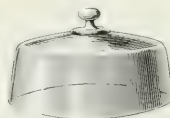
No. 21916



No. 21920



No. 21924



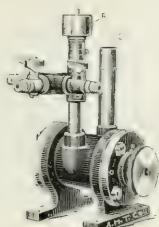
No. 21928



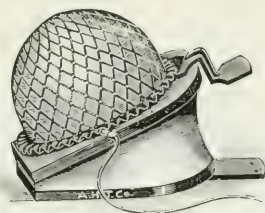
No. 21932

21916.	Bell Glass, of light blown glass, without flange. Very convenient for covering small objects.								
	Diameter, inches.....					3			4
	Height, inches.....					1 1/2			2
	Each.....					.35			.50
21920.	Bell Glass, of heavy glass, with extra wide flange carefully ground for use as air pump receivers.								
	Height, mm.....	80	105	130	180	200	220		260
	Diameter, mm.....	80	105	130	155	175	220		260
	Each.....	.60	.75	1.10	1.60	2.00	2.50		3.00
21924.	Bell Glass, low form, with ground flange.								
	Height, inches.....	1 1/2	2 1/4	3 1/2	4	4 1/2	5	6	8
	Diameter, inches.....	3	4	5	6	7	8	9	10
	Each.....	.50	.60	.75	1.00	1.25	1.50	1.75	2.00
21928.	Bell Glass, low form, without flange. A very convenient shape for covering specimens, etc.								
	Height, mm.....					100	120		180
	Diameter, mm.....					200	240		300
	Each.....					.60	1.50		2.25
21932.	Bell Glass, with open top, with tubulature near bottom and with wide, well ground flange. Suitable for use as an air pump plate.								
	Height, mm.....						300		300
	Diameter, mm.....						150		200
	Each.....						3.00		4.00





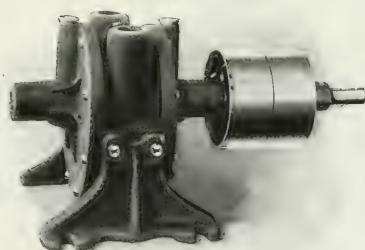
No. 21964



No. 21965



No. 21972



No. 21984 Blower

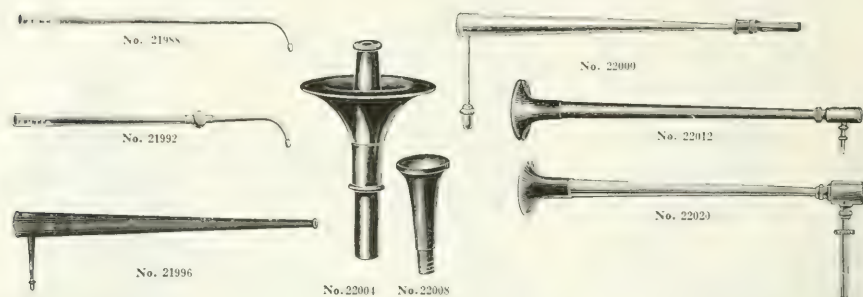


No. 21984 Air Receiver

21960. **Bladders, Animal, dried assorted sizes.** Per dozen..... 1.00
21964. **Blower, High Pressure,** a new patent precision blower absolutely noiseless in operation and highly recommended for laboratory use. Very superior in steadiness of pressure and power required to the ordinary blower operating on the ventilating fan principle. Size A gives 4½ kilos, requires ½ h. p. motor and should be driven at 1100 r. p. m. Size B requires 1 h. p. and gives 8 kilos and should be driven at 700 r. p. m. Size A will operate simultaneously three laboratory blast lamps and Size B will operate six.
- |                | A     | B     |
|----------------|-------|-------|
| Duty Free..... | 18.00 | 30.00 |
| Duty Paid..... | 21.60 | 36.00 |
21968. **Blowers, Foot Power.** These blowers produce a powerful and continuous blast, the pressure of which may be increased by adding one or more rubber discs to the air reservoir.
- |  | A    | B    |
|--|------|------|
| Diameter of air reservoir, inches..... | 7½   | 9    |
| Each.....                              | 5.00 | 7.00 |
21972. **Blowers, Foot Power,** same as No. 21968 but mounted on legs.
- |  | A    | B    |
|--|------|------|
| Diameter of air reservoir, inches..... | 7½   | 9    |
| Each.....                              | 6.00 | 8.00 |
21976. **Rubber Discs** for above Foot Blowers. These discs are cut from steam cured sheet rubber which is made of the best Up-River Para and contains no other ingredients than the necessary sulphur for curing. Will last much longer than discs cut from ordinary rubber sheeting.
- |                       | A   | B   |
|-----------------------|-----|-----|
| Diameter, inches..... | 7½  | 9   |
| Each.....             | .60 | .90 |
21980. **Nets** for above Foot Blowers. Each..... .35
21984. **Blower, Crowell's Positive Pressure.** Will give blast of from 1 to 10 lbs. pressure to the square inch or may be used as a vacuum pump for exhausting of vacuum not exceeding 24 inches of mercury. This apparatus is most satisfactory in securing suction for laboratory filtrations, etc. There are no springs, gears, valves or unbalanced parts and the pump does not have to be reversed when changing from blast to suction. In ordering please state whether or not air reservoir is desired.

Size Number	Cubic Inches per Revolution	Cubic Feet per Minute at Maximum Speed	Revolutions at Maximum Speed	Approximate Horse Power at Three Pounds Pressure	Pulleys Inches	Net Weight Pounds	Pipe Size, Inlet and Outlet	Floor Space Inches	Price of Blower only	Price of receiver with Inlet and Outlet Valve
1-A	20	6.9	600	1	4 x 1	24	1 in.	10 x 6½	\$20.00	8.00
2-A	45	13.	500	1	4 x 1½	34	1½	12½ x 6½	26.00	8.00
3-A	125	25.3	350	1	6 x 2	90	2	22½ x 14	40.00	10.00
4-A	280	40.5	250	1	9 x 3	170	1½	28 x 17	50.00	10.00
5-A	460	53.2	200	1½	10 x 3	225	2	34 x 20	75.00	18.00
6-A	690	79.8	200	2	12 x 4	320	2	38 x 20	100.00	18.00





21988.	Blowpipe, of brass. Length, mm.....	200	225	250	300
	Each.....	.08	.09	.10	.12
21992.	Blowpipe, of brass, with bulb. Length, mm.....	200	225	250	300
	Each.....	.17	.18	.20	.22
21996.	Blowpipe, Black, of japanned tin, with removable brass tip.....				.15
22000.	" " of brass, with screwed on tip, and wooden mouth-piece.....				.50
22004.	Mouth-piece for Blowpipes, of hard rubber, new form.....				.40
22008.	" " " " wood.....				.10
22012.	Blowpipe, Plattner, with hard rubber mouth-piece but without platinum tip.....				1.50
22016.	Platinum Tips, detachable, to fit Plattner Blowpipe No. 22012 at prices depending upon the platinum market.....				
22020.	Blowpipe, Berzelius form, of brass, extra fine finish, with hard rubber mouth-piece and platinum plate placed on end of jet. A very satisfactory form.....				2.00
22022.	Blowpipe, Charcoal, American, willow, of fine uniform grain, 4 x 1 x $\frac{1}{2}$ inches. Per dozen.....				.50
22023.	" " " " of coarser grain than above, $4\frac{1}{2}$ x $1\frac{1}{4}$ x $\frac{1}{2}$ inches. Per dozen.....				.25



22024.	Blowpipe Set of Apparatus and Reagents, as designed by Prof. Butler of the Colorado School of Mines for use in the laboratory and in the field. Each piece is so arranged as to prevent any breakage; outside dimensions $11\frac{1}{4}$ x $6\frac{1}{2}$ x $2\frac{1}{4}$ inches. Complete including wet and dry fluxes and alcohol and oil in lamps.....					17.50
	The outfit consists of the following:—					
	Blowpipe	Anvil	Cobalt Nitrate	Bismuth Flux		
	Platinum Wires and Holder	3 Arsenic Tubes	Hydrochloric Acid	Borax		
	Combination Charcoal Borer.	2 sticks Charcoal	Sulphuric Acid	Potassium Bisulphate		
	Magnet and Chisel	6 open Tubes	Nitric Acid	Oil, Lamp, brass		
	Streak Plate	Large Test Tube	Tin	Alcohol Lamp, brass		
	Blue Litmus	Small "	Microcsmic Salt	Hammer		
	Red Litmus	Ammonium Hydrate	Sodium Carbonate	Platinum Tipped Forceps		
22028.	Pocket Handbook of Blowpipe Analysis, by G. Montague Butler, E. M.....					.75



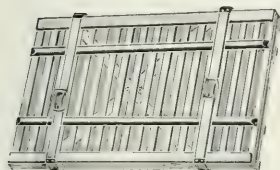
No. 22032



No. 22036



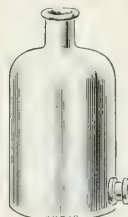
No. 22040



No. 22072



No. 22076



No. 22080



No. 22084

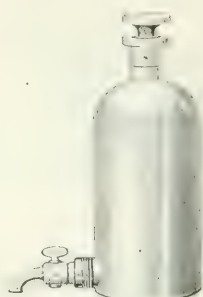
22032. **Boiler**, or saucepan, of best imported enamel ware, white on inside and blue on outside. These goods are made of seamless steel and the enamel is both acid and fire proof and distinctly superior to the ware usually sold for household purposes. Very convenient for use in the preparation of culture media, etc. With cover.
- |                       |           |           |
|-----------------------|-----------|-----------|
| Size, inches.....     | 6 1/2 x 4 | 8 x 5 1/2 |
| Capacity, quarts..... | 2         | 4 1/2     |
| Each.....             | .90       | 1.30      |
22036. **Boiler**, or saucepan, same quality as No. 22032. Without cover.
- |                       |       |               |           |
|-----------------------|-------|---------------|-----------|
| Size, inches.....     | 5 x 3 | 6 1/2 x 3 1/2 | 8 1/2 x 5 |
| Capacity, quarts..... | 1     | 2             | 4         |
| Each.....             | .35   | .50           | .95       |
22040. **Boiler**, or saucepan, double, same quality as No. 22032. Capacities given are for inside boilers.
- |                       |      |      |      |
|-----------------------|------|------|------|
| Capacity, quarts..... | 1    | 2    | 4    |
| Each.....             | 1.50 | 2.25 | 3.25 |
22044. **Bolting Cloth**, as used in making sieves, of standard mesh, 40 inches in width.
- |                               |      |      |      |        |      |       |
|-------------------------------|------|------|------|--------|------|-------|
| Mesh per lineal 1/4 inch..... | 24   | 27   | 31   | 37 1/2 | 44   | 50    |
| Per yard.....                 | 2.60 | 2.80 | 3.40 | 4.15   | 8.50 | 10.00 |
22048. **Botanical Adhesive Tape**, on spool, for fastening specimens to mounting paper, 1/2 inch wide, 36 inches long. Per spool..... .10
22052. **Botanical Drying Paper**, superior quality, as used in the U. S. Department of Agriculture and in other prominent herbaria. This paper, being made of pure cotton stock similar to blotting paper, absorbs the moisture much more readily than the driers usually supplied which contain a certain percentage of wood. 13 1/2 x 18 1/2 inches. Per 100 sheets..... 2.00
22056. **Botanical, Drying Paper**, extra heavy. Per 100 sheets..... 1.50
22060. " **Genus Covers**, extra quality and weight, 17 x 24 1/2 inches, with surface specially prepared for writing upon. Per 100..... 2.50
22064. **Botanical Mounting Paper**. This paper, as well as the Driers and Genus Covers, is made specially for us in very large quantities and we have used in it the purest, strongest stock producing a mount which has that desirable stiffness so seldom found in mounting papers. The color is very white and does not change with age as papers made of impure stock are sure to do. Size 11 1/2 x 17 inches.
- |                     |      |                     |      |
|---------------------|------|---------------------|------|
| Per 100 sheets..... | 1.25 | Per 500 sheets..... | 5.50 |
|---------------------|------|---------------------|------|
22068. **Botanical Pressing Paper**, best white, folded and trimmed. Per ream..... 1.50
22072. " **Portable Plant Press**. This press is light and strong and may be carried into the field with ease. Elastic bands prevent disarrangement of specimens and unused driers when the press is opened. Furnished with six driers..... 2.00
22076. **Botanical Vaseculum or Collecting Case**, of metal, enameled with door opening along entire length. Size 16 x 8 x 5 1/2 inches. With shoulder strap..... 2.00
22080. **Bottles, Aspirator** of heavy white glass, with outlet near bottom.
- |                       |     |     |     |      |      |      |      |      |       |
|-----------------------|-----|-----|-----|------|------|------|------|------|-------|
| Capacity, liters..... | 1/4 | 1/2 | 1   | 2    | 4    | 6    | 8    | 12   | 20    |
| Each.....             | .40 | .50 | .70 | 1.00 | 1.60 | 2.00 | 3.00 | 4.50 | 10.00 |
22084. **Bottles, Aspirator**, of heavy white glass, with outlet tube near bottom formed into nipple for attaching rubber tubing.
- |                       |     |     |     |     |      |      |      |      |      |
|-----------------------|-----|-----|-----|-----|------|------|------|------|------|
| Capacity, liters..... | 1/8 | 1/4 | 1/2 | 1   | 2    | 4    | 6    | 8    | 12   |
| Each.....             | .35 | .40 | .50 | .75 | 1.00 | 1.75 | 2.25 | 3.25 | 4.75 |



No. 22088



No. 22092



No. 22096

22088.	Bottles, Aspirator, same as No. 22084 but graduated.								
	Capacity, liters.....	1	2	4					
	Each.....	.90	1.20	2.10					
22092.	Bottles, Aspirator, with ground glass stopper and glass stopcock ground into outlet.								
	Capacity, liters.....	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8	12	
	Each.....	1.60	1.80	2.00	2.50	4.00	6.00	9.00	
22096.	Bottles, Aspirator, of heavy white glass, with ground in glass stopper and glass stopcock ground in at tubulation and held in place by a metal screw cap.								
	Capacity, gallons.....	1	2	3	5				
	Each.....	7.60	9.15	10.50	13.35				



No. 22100



No. 22101



No. 22108



No. 22112



No. 22120

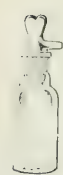


No. 22128



No. 22132

22100.	Bottles, Balsam, with glass balsam dropper fitting loosely in the neck of the bottle and with glass cap ground on. Capacity 45 cc.....	.25		
22104.	Bottle, Balsam, with constricted neck, dropper of wood and ground on cap, 30 cc capacity.....	.50		
22108.	Bottle, Balsam, conical form, with turned in lip for removing excess balsam from rod and conical cap to keep rod in vertical position, capacity 50 cc.....	.40		
22112.	Bottle, Dropping, with ground in pipette stopper with rubber cap to control delivery from pipette.			
	Capacity, oz.....	$\frac{1}{2}$	1	
	Each.....	.25	.25	
22116.	Extra Rubber Caps for No. 22112 Dropping Bottles, per dozen.....	.50		
22120.	Bottle, Dropping, with Barnes' pipette stopper. A very convenient and inexpensive bottle. Capacity 30 cc.....	.10		
22124.	Extra Rubber Bulb and pipette only for No. 22120 Bottles.....	.05		
22128.	Bottle, Dropping, with ground in pipette. Delivery may be controlled by finger or by the use of a rubber bulb.			
	Capacity, cc.....	15	30	50
	Each.....	.15	.18	.20
22132.	Bottle, Dropping, same as No. 22128 but with rubber bulb.			
	Capacity, cc.....	15	30	50
	Each.....	.19	.22	.25
22136.	Bottle, Dropping, same as No. 22128 but of amber glass.			
	Capacity, cc.....		30	50
	Each.....		.25	.30
22140.	Bottle, Dropping, same as No. 22136 but with rubber bulb.			
	Capacity, cc.....		30	50
	Each.....		.30	.35



No. 22144



No. 22148



No. 22152



No. 22160



No. 22168



No. 22170

22144.	Bottle Dropping, TK patent with stopper arranged to deliver contents drop by drop or to hermetically seal the bottle.				
	Capacity, cc.....	15	30	50	100
	Each.....	.15	.18	.20	.30
22148.	Bottle Dropping, same as No. 22144 but with flat stopper protecting the lip of the bottle from dust.				
	Capacity, cc.....	15	30	50	100
	Each.....	.25	.25	.30	.40
22152.	Bottle Dropping, same as No. 22148 but of amber glass.				
	Capacity, cc.....	15	30	50	100
	Each.....	.28	.28	.35	.50
22156.	Bottle Dropping, with ground in pipette stopper and glass cap ground on. Very suitable for highly volatile contents.				
	Capacity, cc.....			30	60
	Each.....			.45	.60
22160.	Bottle Dropping, Schuster, with ground glass stopper, capacity 30 cc.....				.25
22164.	" " " same as No. 22160 but without glass stopper.....				.15
22168.	Bottle, Cobalt or Acid, with solid glass stopper and glass cap ground on.				
	Capacity, cc.....	15	25		50
	Each.....	.30	.35		.40
22170.	Bottle, Immersion Oil, with loose fitting glass cap, with glass dropping rod fused to same.....				.50



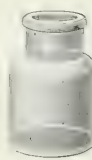
No. 22172



No. 22174



No. 22176



No. 22180



No. 22184



No. 22188

22172.	Bottle, Immersion Oil, New Form, with loose fitting metal cap and dropper. The immersion oil is used in the inside receptacle only in small quantities at a time so that it is impossible to withdraw a large drop. The outer compartment is to be filled with benzole, xylol, alcohol, etc., for cleaning objectives and slides, having no connection with the inside or oil compartment.....				.75
22174.	Bottle, Immersion Oil, Bausch & Lomb, with metallic cap.....				.50
22176.	Bottle, Immersion Oil, Mach, with metallic cap.....				.75
22180.	Bottles, Specimen, wide mouth, of flint glass, for cork stoppers				
	Capacity, ounces.....	1½	2½	3½	
	Per dozen.....	.50	.55	.65	
	Per gross.....	3.90	4.40	5.15	
22184.	Bottles, Specimen, extra wide mouth and very narrow shoulder, of best American flint glass, for cork stoppers.				
	Capacity, oz.....	1½	3	4	6
	Per dozen.....	.60	.65	.85	.85
22188.	Bottles, Specimen, with extra wide mouth for cork stoppers. Of best white German glass. This series of bottles has been designed to meet the need of a more satisfactory bottle for specimens in pathological and histological laboratories, etc., and is superior in both shape and finish to the American bottle listed under No. 22184.				
	Capacity, etc.....	15	30	50	75
	Per 10.....	.60	.65	.75	.85
	Per 100.....	5.00	5.50	6.00	7.00
					8.00





<b>22200. Bottles, Narrow Mouth, best American flint glass for cork stoppers.</b>													
Capacity, ounces.....	$\frac{1}{2}$	1	2	3	4	6	8	10	12	16	32	64	
Number in original case.....	864	864	720	576	432	360	288	216	216	144	96		
Per dozen.....	.35	.40	.50	.50	.55	.65	.70	.85	.90	1.05	1.55	2.60	
Per gross in original case.....	3.25	3.50	3.90	4.75	5.40	6.15	7.00	8.25	9.00	10.15	15.50	25.65	
<b>22204. Bottles, Narrow Mouth, best American amber glass, for cork stoppers. Shape same as No. 22200.</b>													
Capacity, ounces.....		1	2	3	4	6	8	10	12	16	32		
Number in original case.....		864	720	576	432	360	288	216	216	144	96		
Per dozen.....		.35	.40	.50	.55	.65	.70	.85	.90	1.05	1.55		
Per gross in original case.....		3.50	3.90	4.75	5.40	6.15	7.00	8.25	9.00	10.15	15.50		
<b>22208. Bottles, Narrow Mouth, best American green glass, for cork stoppers.</b>													
Capacity.....	1 oz.	2 oz.	4 oz.	$\frac{1}{2}$ pt.	1 pt.	1 qt.	2 qt.	1 gal.	5 gal.				
Number in original case.....	864	720	432	288	144	96	48	36	6				
Per dozen.....	.35	.40	.55	.70	1.05	1.55	2.40	4.00	17.00				
Per gross in original case.....	3.50	3.90	5.40	7.00	10.15	15.50	24.00	40.00	170.00				
<b>22210. Bottles, Wide Mouth, best American flint glass, for cork stoppers.</b>													
Capacity, ounces.....	$\frac{1}{2}$	1	2	3	4	6	8	10	12	16	32	64	
Number in original case.....	864	864	720	576	432	360	288	216	216	144	96		
Per dozen.....	.35	.40	.50	.50	.55	.65	.70	.85	.90	1.05	1.55	2.60	
Per gross in original case.....	3.90	3.65	4.00	4.90	5.65	6.40	7.25	8.25	9.00	10.15	15.50	25.65	
Capacity, ounces.....	8	12	16	24	32	64	48	36	24	16	12	8	
Number in original case.....	288	216	144	120	96	48	36	24	16	12	8	6	
Per dozen.....	.75	.95	1.10	1.45	1.50	2.65	2.25	1.75	1.50	1.25	1.00	.75	
Per gross in original case.....	7.25	9.50	10.65	14.50	15.90	26.15	22.50	18.00	15.00	12.00	9.00	6.00	
<b>22214. Bottles, Wide Mouth, best American amber glass, for cork stoppers. Shape same as No. 22210.</b>													
Capacity, ounces.....	1	2	4	8	16	32	48	36	24	16	12	8	
Number in original case.....	864	720	432	288	144	96	48	36	24	16	12	8	
Per dozen.....	.40	.40	.60	.75	1.10	1.50	2.25	1.75	1.50	1.25	1.00	.75	
Per gross in original case.....	3.65	4.00	5.65	7.25	10.65	15.85	21.50	18.00	15.00	12.00	9.00	6.00	
<b>22218. Bottles, Wide Mouth, of green glass, for cork stoppers.</b>													
Capacity.....	1 oz.	2 oz.	4 oz.	8 oz.	16 oz.	1 qt.	2 qt.	1 gal.	2 gal.	5 gal.			
Number in original case.....	864	720	432	288	144	96	48	36	12	6			
Per dozen.....	.36	.40	.60	.75	1.10	1.60	2.50	4.10	12.80	18.35			
Per gross in original case.....	3.65	4.00	5.65	7.25	10.65	15.85	21.50	40.15	102.50	175.00			
<b>22222. Bottles, Narrow Mouth, flint glass, with high ground mushroom glass stopper. This bottle has a fine, fire polished finish approaching shop furniture ware in appearance and is much superior to iron mould finish. Recommended specially for laboratory or other uses where a bottle of better appearance is desired.</b>													
Capacity.....	1 oz.	2 oz.	4 oz.	6 oz.	12 oz.	$\frac{1}{2}$ pt.							
Number in original case.....	144	72	72	72	72	72							
Per dozen.....	1.00	1.25	1.50	1.65	1.90	1.75							
Per dozen in original case.....	.80	1.00	1.20	1.35	1.55	1.40							
Capacity.....	1 pt.	1 qt.	$\frac{1}{2}$ gal.	1 gal.	2 gal.	3 gal.							
Number in original case.....	72	36	12	12	6	4							
Per dozen.....	2.00	2.25	4.00	6.00	13.00	20.00							
Per dozen in original case.....	1.60	1.80	3.20	4.80	10.40	16.00							
<b>22226. Bottles, Wide Mouth, same quality, etc., as No. 22222.</b>													
Capacity.....	1 oz.	2 oz.	4 oz.	$\frac{1}{2}$ pt.	1 pt.	1 qt.	$\frac{1}{2}$ gal.	1 gal.	2 gal.				
Number in original case.....	144	72	72	72	72	36	12	12					
Per dozen.....	1.25	1.50	1.75	2.25	2.50	3.25	5.00	8.00	18.00				
Per dozen in original case.....	1.00	1.20	1.40	1.80	2.00	2.60	4.00	6.40	14.40				



22230.	Bottles, Narrow Mouth, with vertical glass stopper, of green glass, for acids.							
	Capacity.....	$\frac{1}{2}$ pt.	1 pt.	1 qt.	$\frac{1}{2}$ gal.	1 gal.	2 gal.	
	Number in original case.....	144	144	96	48	36	12	
	Per dozen.....	2.00	2.50	3.40	5.60	7.60	16.00	
	Per gross in original case.....	20.00	25.00	34.00	56.00	76.00	160.00	
22234.	Bottles, Narrow Mouth, of white glass with flat glass stopper. These bottles are of German make and are distinctly superior in both shape and finish to American bottles of corresponding price. They are turned in a wet wooden mould which imparts a high lustre to the outside surface. Particularly recommended for use as laboratory reagent bottles.							
	Capacity, cc.....	15	30	60	125	250	500	1000
	Number in original case.....	1800	1100	600	500	325	180	120
	Each.....	.10	.10	.12	.15	.18	.25	.35
	Per 100 in original case.....	8.40	8.40	9.80	10.85	15.40	19.60	28.00
22238.	Bottles, Narrow Mouth, of white glass, with vertical stopper. Same quality as No. 22234.							
	Capacity, cc.....	15	30	60	125	250	500	1000
	Number in original case....	1800	1100	600	500	325	180	120
	Each.....	.10	.10	.12	.15	.18	.25	.35
	Per 100 in original case....	8.40	8.40	9.80	10.85	15.40	19.60	28.00
22242.	Bottles, Narrow Mouth, of amber glass, with vertical stopper. Same quality and shape as No. 22238.							
	Capacity, cc.....		30	60	125	250	500	1000
	Number in original case.....		1100	600	500	325	180	120
	Each.....		.11	.13	.14	.20	.25	.35
	Per 100 in original case.....		9.45	10.85	11.90	17.15	21.70	30.80
22246.	Bottles, Wide Mouth, of white glass, with flat glass stopper. Same quality as No. 22234.							
	Capacity, cc.....	15	30	60	125	250	500	1000
	Number in original case.....	1800	1100	600	500	325	180	120
	Each.....	.11	.11	.13	.14	.20	.25	.35
	Per 100 in original case.....	9.45	9.45	10.85	11.90	17.15	21.70	30.80
22250.	Bottles, Wide Mouth, of white glass, with vertical stopper. Same quality as No. 22234.							
	Capacity, cc.....	15	30	60	125	250	500	1000
	Number in original case.....	1800	1100	600	500	325	180	120
	Each.....	.11	.11	.12	.14	.20	.25	.35
	Per 100 in original case.....	9.45	9.45	10.15	11.90	17.15	21.70	30.80
22254.	Bottles, Wide Mouth, of amber glass, with vertical stopper. Same quality and shape as No. 22250.							
	Capacity, cc.....		30	60	125	250	500	1000
	Number in original case.....		1100	600	500	325	180	120
	Each.....		.12	.14	.15	.22	.28	.40
	Per 100 in original case.....		10.15	11.90	13.15	18.60	23.80	33.60
22258.	Bottles, New Jena Glass, narrow mouth, with flat glass stopper. These bottles are made of apparatus glass and are offered as the most resistant bottle obtainable for reagents.							
	Capacity, cc.....				100	250	500	1000
	Each.....				.43	.45	.70	.95



See text page 81

**REAGENT BOTTLES, S. B. S. Type**, of best German glass, with conical stopper with projecting flange to protect the bottle from dust in the narrow mouth shape and a flat hexagonal stopper projecting over the rim in the wide mouth shapes. The stopper can be placed on the table either on its side or inverted, without contact of the ground surface. Bottles for alkaline solutions, such as Potassium hydrate are made with a loosely fitting stoppers inside the neck but with the under side of the flange ground to fit the upper surface of the mouth of the bottle. Bottles are carried in stock in the labels designated below. Labels are deeply etched into the glass by means of sand blast and filled with white pigment. In ordering please use numbers. Special labels are engraved to order at an extra cost of 25¢ each. The bottles may be imported duty free at an approximate reduction of 33 $\frac{1}{3}$ %, but orders must aggregate at least 100 bottles of a size.

**22270. Reagent Bottle, Narrow Mouth, 125 cc capacity, as above, with labels as below.**

Each.....	.25	Per dozen.....	2.50
B 1. Hydrogen Sulphide (Amber) H <sub>2</sub> S		B21. Magnesium Sulphate Mg SO <sub>4</sub>	
B 2. Hydrochloric Acid HCl		B25. Mercuric Chloride Hg Cl <sub>2</sub>	
B 3. Acetic Acid HC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>		B26. Silver Nitrate (Amber) Ag NO <sub>3</sub>	
B 4. Sulphuric Acid H <sub>2</sub> SO <sub>4</sub>		B27. Lead Acetate Pb (C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub>	
B 5. Nitric Acid HNO <sub>3</sub>		B28. Ferrous Sulphate FeSO <sub>4</sub>	
B 6. Potassium Ferrocyanide K <sub>4</sub> Fe(CN) <sub>6</sub>		B29. Ferric Chloride FeCl <sub>3</sub>	
B 7. Potassium Sulphocyanide KCNS		B30. Alcohol C <sub>2</sub> H <sub>5</sub> OH	
B 8. " Carbonate K <sub>2</sub> CO <sub>3</sub>		B31. Ammonium Sulphocyanide NH <sub>4</sub> CNS	
B 9. " Sulphate K <sub>2</sub> SO <sub>4</sub>		B32. Barium Hydroxide Ba(OH) <sub>2</sub>	
B10. " Iodide KI		B33. Ether (C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> O	
B11. " Ferricyanide K <sub>3</sub> Fe(CN) <sub>6</sub>		B36. Cupric Sulphate CuSO <sub>4</sub>	
B12. " Hydroxide KOH		B37. Platinum Chloride PtCl <sub>4</sub>	
B13. " Dichromate K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>		B38. Uranium Acetate UO <sub>2</sub> (C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub>	
B14. Sodium Phosphate Na <sub>2</sub> HPO <sub>4</sub>		B38. Fehling's Solution	
B15. Ammonium Hydroxide NH <sub>4</sub> OH		B59. Sodium Carbonate Na <sub>2</sub> CO <sub>3</sub>	
B16. " Sulphide (Amber) (NH <sub>4</sub> ) <sub>2</sub> S		B60. " Acetate NaC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	
B17. " Chloride NH <sub>4</sub> Cl		B61. " Hydroxide NaOH	
B18. " Carbonate (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>		B81. Stannous Chloride SnCl <sub>2</sub>	
B19. " Oxalate (NH <sub>4</sub> ) <sub>2</sub> C <sub>2</sub> O <sub>4</sub>		B82. Ammonium Molybdate (NH <sub>4</sub> ) <sub>2</sub> MoO <sub>4</sub>	
B20. Barium Chloride BaCl <sub>2</sub>		B83. Carbon Disulphide CS <sub>2</sub>	
B21. Calcium Chloride CaCl <sub>2</sub>		B86. Mercurous Nitrate Hg <sub>2</sub> (NO <sub>3</sub> ) <sub>2</sub>	
B22. " Sulphate CaSO <sub>4</sub>		B96. Potassium Chromate K <sub>2</sub> CrO <sub>4</sub>	
B23. " Hydroxide Ca (OH) <sub>2</sub>			

**22274. Reagent Bottle, Narrow Mouth, 250 cc capacity, as above, with labels as below.**

Each.....	.30	Per dozen.....	3.20
B101. Sulphuric Acid, Con. H <sub>2</sub> SO <sub>4</sub>		B114. Barium Chloride BaCl <sub>2</sub>	
B102. " Dil. H <sub>2</sub> SO <sub>4</sub>		B122. Ammonium Sulphide (Amber) (NH <sub>4</sub> ) <sub>2</sub> S	
B103. Nitric Acid, Con. HNO <sub>3</sub>		B126. Alcohol C <sub>2</sub> H <sub>5</sub> OH	
B104. " Dil. HNO <sub>3</sub>		B129. Sodium Phosphate Na <sub>2</sub> HPO <sub>4</sub>	
B105. Hydrochloric Acid, Con. HCl		B130. Ammonium Oxalate (NH <sub>4</sub> ) <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	
B106. " Dil. HCl		B131. Acetic Acid HC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	
B107. Hydrogen Sulphide (Amber) H <sub>2</sub> S		B145. Silver Nitrate (Amber) Ag NO <sub>3</sub>	
B108. Ammonium Hydroxide NH <sub>4</sub> OH		B150. Potassium Hydroxide KOH	
B109. " Chloride NH <sub>4</sub> Cl		B151. Calcium Hydroxide Ca (OH) <sub>2</sub>	
B110. " Carbonate (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>		B152. Lead Acetate Pb (C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub>	
B111. Sodium Hydroxide NaOH		B154. Ferrous Sulphate FeSO <sub>4</sub>	
B112. Carbonate Na <sub>2</sub> CO <sub>3</sub>			

**22278. Reagent Bottle, Narrow Mouth, 500 cc capacity, as above, with labels as below.**

Each.....	.40	Per dozen.....	4.50
B204. Ammonium Hydroxide NH <sub>4</sub> OH		B216. Nitric Acid HNO <sub>3</sub>	
B215. Sulphuric Acid H <sub>2</sub> SO <sub>4</sub>		B217. Hydrochloric Acid HCl	

**22282. Reagent Bottle, Narrow Mouth, 1000 cc capacity, as above, with labels as below.**

Each.....	.50	Per dozen.....	5.50
B501. Sulphuric Acid, Con. H <sub>2</sub> SO <sub>4</sub>		B505. Hydrochloric Acid, Con. HCl	
B502. " Dil. H <sub>2</sub> SO <sub>4</sub>		B506. " Dil. NCl	
B503. Nitric Acid, Con. HNO <sub>3</sub>		B512. Ammonium Hydroxide NH <sub>4</sub> OH	
B504. " Dil. HNO <sub>3</sub>			

22286. Reagent Bottle, Wide Mouth, 125 cc capacity, as above described, with labels as below. Each .25 Per dozen . 2.80

B301. Sodium Carbonate $\text{Na}_2\text{CO}_3$	B305. Ferrous Sulphate $\text{FeSO}_4$
B302. Potassium Nitrate $\text{KNO}_3$	B312. Test Paper
B303. " Cyanide KCN	B313. Sodium Ammonium Hydrogen Phosphate $\text{Na}(\text{NH}_4)\text{H}_2\text{PO}_4$
B304. Borax $\text{Na}_2\text{B}_4\text{O}_7$	

22290. Reagent Bottles, Set of 40 as above described, with labels as per list below, consisting of 28 narrow mouth 125 cc Bottles; 5 narrow mouth 250 cc Bottles; 6 wide mouth 125 cc. Bottles and one 30 cc dropping bottle. 8.00

22294. Reagent Bottles, Set of 40 as above described, filled with the following c. p. reagents, sealed and packed. 17.00

#### 250 cc Narrow Mouth Bottles.

Acid Sulphuric (dil) $\text{H}_2\text{SO}_4$	Lead Acetate $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$
" Hydrochloric $\text{HCl}$	Magnesium Sulphate $\text{MgSO}_4$
" Nitric $\text{HNO}_3$	Mercuric Chloride $\text{HgCl}_2$
Ammonium Hydrate $(\text{NH}_4)\text{HO}$	Mercurous Nitrate $\text{Hg}_2(\text{NO}_3)_2$
Blank	Platinum Chloride $\text{PtCl}_4$ (1 oz dropping bottle)

#### 125 cc Narrow Mouth Bottles

Acid Sulphuric conc. $\text{H}_2\text{SO}_4$	Potassium Acid Chromate $\text{K}_2\text{Cr}_2\text{O}_7$
Ammonium Chloride $(\text{NH}_4)\text{Cl}$	" Ferrocyanide $\text{K}_4\text{Fe}(\text{CN})_6$
" Oxalate $(\text{NH}_4)_2\text{C}_2\text{O}_4$	" Iodide KI
" Sulfoxyanide $(\text{NH}_4)\text{CNS}$	Sodium Carbonate $\text{Na}_2\text{CO}_3$
" Molybdate $(\text{NH}_4)_2\text{MoO}_4$	" Acetate $\text{NaC}_2\text{H}_3\text{O}_2$
" Carbonate $(\text{NH}_4)_2\text{CO}_3$	" Phosphate $\text{NaH}_2\text{PO}_4$
Acid Acetic $\text{HC}_2\text{H}_3\text{O}_2$	Uranium Acetate $(\text{UO})\text{C}_2\text{H}_3\text{O}_4$
Alcohol $(\text{C}_2\text{H}_5)\text{OH}$	Ether $(\text{C}_2\text{H}_5)_2\text{O}$
Silver Nitrate $\text{AgNO}_3$ (amber)	Blank
Barium Chloride $\text{BaCl}_2$	
Calcium Hydrate $\text{Ca}(\text{OH})_2$	
Cupric Sulphate $\text{CuSO}_4$	
Ferric Chloride $\text{FeCl}_3$	
Hydric Sulphide $\text{H}_2\text{S}$ (amber)	
Ammonium Sulphide $(\text{NH}_4)_2\text{S}$ (amber)	

#### 125 cc Wide Mouth Bottles

Sodium Carbonate $\text{Na}_2\text{CO}_3$
Borax
Ferrous Sulphate $\text{FeSO}_4$
Potassium Cyanide KCN
Ammonium Sodium Phosphate $\text{Na}(\text{NH}_4)\text{H}_2\text{PO}_4$
+ $\text{H}_2\text{O}$
Test Paper

REAGENT BOTTLES, Whittall-Tatum Company, with ground-glass labels, blown in the glass, the surface of each letter being ground so as to render it distinct. The lettering is thus indestructible and in no danger of being defaced when the bottle is washed or handled, and the inconvenience and unsightly appearance attending the use of paper labels is entirely avoided. The bottles are made of glass containing no lead, zinc or other metallic flux, and, in the points of convenient shape, thin, dropping lip and perfect stoppering, are unequalled. They are exclusively used in many of the leading laboratories in the U. S. See illustration on preceding page.

Reagent Bottles, Narrow Mouth, as above described. For names available in each capacity see list below. Names not in list may be engraved on bottles at an extra charge of 50¢ per dozen net. Please use numbers in ordering.

Capacity.....	1 oz.	$\frac{1}{4}$ pt.	$\frac{1}{2}$ pt.	1 pt.	1 qt.
Per dozen.....	1.25	1.75	2.50	3.25	4.00
Per gross.....	12.00	18.50	23.00	33.00	

22300. Reagent Bottles, Narrow Mouth, One ounce height, 3 $\frac{1}{4}$  inches.

No. 326. Cobaltous Nitrate..... $\text{Co}(\text{NO}_3)_2$	No. 325. Silver Nitrate (Amber)..... $\text{AgNO}_3$
" 336. Gold Chloride..... $\text{AuCl}_3$	" 311. Blank
" 327. Platonic Chloride..... $\text{PtCl}_4$	

22304. Reagent Bottles, Narrow Mouth, One-fourth pint, height 5 $\frac{1}{4}$  inches.

No. 3. Acetic Acid..... $\text{HC}_2\text{H}_3\text{O}_2$	No. 97. Ammonium Sulphhydrate..... $\text{NH}_4\text{HS}$
" 30. Alcohol..... $\text{C}_2\text{H}_5\text{OH}$	" 401. Barium Nitrate..... $\text{Ba}(\text{NO}_3)_2$
" 18. Ammonium Carbonate..... $(\text{NH}_4)_2\text{CO}_3$	" 426. Bromine for Hypo-Bromite
" 17. " Chloride..... $\text{NH}_4\text{Cl}$	" 406. " Water
" 15. " Hydroxide..... $\text{NH}_4\text{OH}$	" 418. Calcium Chloride Anhydrous $\text{CaCl}_2$
" 19. " Oxalate..... $(\text{NH}_4)_2\text{C}_2\text{O}_4$	" 83. Carbon Disulphide..... $\text{CS}_2$
" 16. " Sulphide (Amber)..... $\text{NH}_4_2\text{S}$	" 407. Chloroform..... $\text{CHCl}_3$
" 31. " Sulphocyanide..... $\text{NH}_4\text{CNS}$	" 408. Cocaine
" 33. Barium Carbonate..... $\text{BaCO}_3$	" 409. Coralline
" 20. " Chloride..... $\text{BaCl}_2$	" 421. Dimethyl Glucose..... $(\text{CH}_3)_2\text{C}_6\text{H}_{10}\text{O}_5$
" 32. " Hydroxide..... $\text{Ba}(\text{OH})_2$	" 419. Hydrochloric Acid, Con..... $\text{HCl}$
" 21. Calcium Chloride..... $\text{CaCl}_2$	" 428. Hydrogen Peroxide
" 23. " Hydroxide..... $\text{Ca}(\text{OH})_2$	" 87. Indigo Solution
" 22. " Sulphate..... $\text{CaSO}_4$	" 414. Iodine Solution..... $\text{I}+\text{KI}$
" 36. Cupric Sulphate..... $\text{CuSO}_4$	" 410. Litmus
" 35. Ether..... $\text{C}_2\text{H}_5_2\text{O}$	" 90. Magnesia Mixture
" 29. Ferric Chloride..... $\text{FeCl}_3$	" 100. Mercuric Potassium Iodide
" 28. Ferrous Sulphate..... $\text{FeSO}_4$	" 86. Mercurous Nitrate..... $\text{Hg}_2(\text{NO}_3)_2$
" 2. Hydrochloric Acid..... $\text{HCl}$	" 415. Methyl Alcohol..... $\text{CH}_3\text{OH}$
" 1. Hydrogen Sulphide (Amber)..... $\text{H}_2\text{S}$	" 411. Methyl Orange
" 27. Lead Acetate..... $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$	" 88. Nessler's Solution
" 24. Magnesium Sulphate..... $\text{MgSO}_4$	" 422. Nitric Acid, Con..... $\text{HNO}_3$
" 24. Mercuric Chloride..... $\text{HgCl}_2$	" 425. Obermayer's Reagent
" 5. Nitric Acid..... $\text{HNO}_3$	" 83. Oxalic Acid..... $\text{H}_2\text{C}_2\text{O}_4$
" 8. Potassium Carbonate..... $\text{K}_2\text{CO}_3$	" 423. Phenol..... $\text{C}_6\text{H}_5\text{OH}$
" 13. " Dichromate..... $\text{K}_2\text{Cr}_2\text{O}_7$	" 412. Phenolphthalein
" 11. " Ferrocyanide..... $\text{K}_4\text{Fe}(\text{CN})_6$	" 94. Picric Acid..... $\text{C}_6\text{H}_3(\text{OH})_3\text{NO}_2$
" 6. " Ferrocyanide..... $\text{K}_3\text{Fe}(\text{CN})_6$	" 37. Platonic Chloride..... $\text{PtCl}_4$
" 12. " Hydroxide..... $\text{KOH}$	" 96. Potassium Chromate..... $\text{K}_2\text{CrO}_4$
" 10. " Iodide.....KI	" 404. Silver Sulphate..... $\text{Ag}_2\text{SO}_4$
" 9. " Sulphate..... $\text{K}_2\text{SO}_4$	" 60. Sodium Acetate..... $\text{NaC}_2\text{H}_3\text{O}_2$
" 7. " Sulphocyanide..... $\text{KSCN}$	" 59. " Carbonate..... $\text{Na}_2\text{CO}_3$
" 26. Silver Nitrate (Amber)..... $\text{AgNO}_3$	" 416. " Cobaltic Nitrite
" 39. Sodium Carbonate..... $\text{Na}_2\text{CO}_3$	" 61. " Hydroxide..... $\text{NaOH}$
" 61. " Hydroxide..... $\text{NaOH}$	" 427. " Bromite for Hypo-
" 14. " Phosphate..... $\text{Na}_2\text{HPO}_4$	" 417. " Thiosulphate..... $\text{Na}_2\text{S}_2\text{O}_4$
" 4. Sulphuric Acid..... $\text{H}_2\text{SO}_4$	" 81. Stannous Chloride..... $\text{SnCl}_2$
" 38, 39 and 40. Blank	

The above 40 bottles are furnished as a set for.....

No. 77. Ammonia..... $\text{FH}_3$	83.75
" 82. Ammonium Molybdate..... $\text{NH}_4\text{MoO}_4$	

" 120. Sulphuric Acid, Con..... $\text{H}_2\text{SO}_4$	
" 124. Tinct Guaiac	
" 413. Turmeric	



## 22308. Reagent Bottles, Narrow Mouth, One-half pint, height 6½ inches.

No. 131.	Acetic Acid.....	$\text{HC}_2\text{H}_3\text{O}_2$	No. 107.	Hydrogen Sulphide (Amber).....	$\text{H}_2\text{S}$
" 126.	Alcohol.....	$\text{C}_2\text{H}_5\text{OH}$	" 132.	Lead Acetate.....	$\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2$
" 157.	Ammonia.....	$\text{NH}_3$	" 153.	Mercuric Chloride.....	$\text{HgCl}_2$
" 110.	Ammonium Carbonate.....	$(\text{NH}_4)_2\text{CO}_3$	" 103.	Nitric Acid, Con.....	$\text{HNO}_3$
" 109.	" Chloride.....	$\text{NH}_4\text{Cl}$	" 104.	" Dil.....	$\text{HNO}_3$
" 108.	" Hydroxide.....	$\text{NH}_4\text{OH}$	" 150.	Potassium Hydroxide.....	$\text{KOH}$
" 155.	" Molybdate.....	$(\text{NH}_4)_6\text{MoO}_7$	" 145.	Silver Nitrate (Amber).....	$\text{AgNO}_3$
" 130.	" Oxalate.....	$(\text{NH}_4)_2\text{C}_2\text{O}_4$	" 112.	Sodium Carbonate.....	$\text{Na}_2\text{CO}_3$
" 122.	" Sulphide (Amber).....	$\text{NH}_4\text{S}$	" 111.	" Hydroxide.....	$\text{NaOH}$
" 111.	Barium Chloride.....	$\text{BaCl}_2$	" 129.	" Phosphate.....	$\text{Na}_2\text{HPO}_4$
" 151.	Calcium Hydroxide.....	$\text{Ca}(\text{OH})_2$	" 156.	Stannous Chloride.....	$\text{SnCl}_2$
" 154.	Ferrous Sulphate.....	$\text{FeSO}_4$	" 101.	Sulphuric Acid, Con.....	$\text{H}_2\text{SO}_4$
" 105.	Hydrochloric Acid, Con.....	$\text{HCl}$	" 102.	" Dil.....	$\text{H}_2\text{SO}_4$
" 106.	" Dil.....	$\text{HCl}$	" 116.	Blank	

## 22312. Reagent Bottles, Narrow Mouth, One pint, height 7½ inches.

No. 204.	Ammonium Hydroxide.....	$\text{NH}_4\text{OH}$	No. 222.	Hydrochloric Acid, Con.....	$\text{HCl}$
" 227.	" Dil.....	$\text{NH}_4\text{OH}+\text{Aq}$	" 226.	Hydrodisodic Phosphate.....	$\text{Na}_2\text{HPO}_4$
" 229.	" Sulphide, Dil.....	$(\text{NH}_4)_2\text{S}+\text{Aq}$	" 216.	Nitric Acid.....	$\text{HNO}_3$
" 218.	Barium Chloride.....	$\text{BaCl}_2$	" 219.	" Con.....	$\text{HNO}_3$
" 223.	Calcium Hydroxide.....	$\text{Ca}(\text{OH})_2$	" 221.	Potassium Hydroxide.....	$\text{KOH}$
" 225.	" Sulphate.....	$\text{CaSO}_4$	" 228.	Sodium Hydroxide, Dil.....	$\text{NaOH}+\text{Aq}$
" 230.	Ether.....	$(\text{C}_2\text{H}_5)_2\text{O}$	" 215.	Sulphuric Acid.....	$\text{H}_2\text{SO}_4$
" 221.	Ferrous Sulphate.....	$\text{FeSO}_4$	" 220.	" Con.....	$\text{H}_2\text{SO}_4$
" 217.	Hydrochloric Acid.....	$\text{HCl}$	" 211.	Blank	

## 22316. Reagent Bottles, Narrow Mouth, One quart, height 9½ inches.

No. 503.	Hydrochloric Acid, Con.....	$\text{HCl}$	No. 501.	Sulphuric Acid, Con.....	$\text{H}_2\text{SO}_4$
" 506.	" Dil.....	$\text{HCl}$	" 502.	" Dil.....	$\text{H}_2\text{SO}_4$
" 503.	Nitric Acid, Con.....	$\text{HNO}_3$	" 511.	Blank	
" 504.	" Dil.....	$\text{HNO}_3$			

## Reagent Bottles, Wide Mouth, as above described.

Capacity.....	1 oz.	4 oz.
Per dozen.....	1.35	1.95
Per gross.....	13.00	20.50

## 22320. Reagent Bottles, Wide Mouth, One ounce, height 3½ inches.

No. 374.	Ammonium Phosphate.....	$(\text{NH}_4)_3\text{HPO}_4$	No. 354.	Potassium Nitrate.....	$\text{KNO}_3$
" 361.	Sodium Phosphate.....	$\text{Na}_2\text{H}_2\text{P}_2\text{O}_7$	" 372.	Test Paper	
" 351.	Borax.....	$\text{Na}_2\text{B}_4\text{O}_7$	" 353.	Sodium Acetate.....	$\text{NaC}_2\text{H}_3\text{O}_2$
" 364.	Copper.....	$\text{Cu}$	" 369.	Bitartrate.....	$\text{NaHC}_4\text{H}_4\text{O}_6$
" 365.	Ferrous Sulphate.....	$\text{FeSO}_4$	" 350.	" Carbonate.....	$\text{Na}_2\text{CO}_3$
" 366.	" Sulphide.....	$\text{FeS}$	" 370.	" Nitrate.....	$\text{NaNO}_3$
" 377.	Phenyl Hydrazine.....	$\text{C}_6\text{H}_5\text{NH}_2$	" 367.	Sodium Potassium Carbonate.....	$\text{Na}_2\text{CO}_3, \text{K}_2\text{CO}_3$
" 367.	Potassium Chlorate.....	$\text{KClO}_3$	" 371.	Starch	
" 358.	Cyanide.....	$\text{KCN}$	" 373.	Zinc	
" 368.	" Ferricyanide.....	$\text{K}_3\text{Fe}(\text{CN})_6$	" 375.	Blank	

## 22324. Reagent Bottles, Wide Mouth, Four ounce, height, 4½ inches.

No. 314.	Ammonium Sulphate.....	$(\text{NH}_4)_2\text{SO}_4$	No. 313.	Sodium Ammonium Hydrogen Phosphate.....	$\text{Na}(\text{NH}_4)\text{HPO}_4$
" 304.	Borax.....	$\text{Na}_2\text{B}_4\text{O}_7$			
" 305.	Ferrous Sulphate.....	$\text{FeSO}_4$	" 301.	Sodium Carbonate.....	$+\text{H}_2\text{O}$
" 303.	Potassium Cyanide.....	$\text{KCN}$	" 312.	Test Paper	$\text{Na}_2\text{CO}_3$
" 302.	" Nitrate.....	$\text{KNO}_3$	" 307.	Blank	



View of Shipping Room



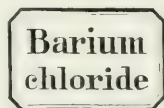
No. 22328



No. 22332



No. 22336



No. 22336



No. 22360

22328. REAGENT BOTTLES, Narrow Mouth, with name and symbol, of hard white potash glass, with polished bottoms, and flat stoppers; with white enameled labels with double border and brilliant black acid proof letters and figures for both name and symbol. Exactly like illustration. Because of the great variety of labels used and the alternatives offered these bottles are not carried in stock and are imported to order only in quantities aggregating not less than \$25.00 in value.
- | Capacity, cc.....    | 50  | 100 | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|----------------------|-----|-----|-----|-----|-----|------|------|------|
| Each, Duty Free..... | .30 | .35 | .40 | .45 | .50 | .60  | .85  | 1.25 |
| Each, Duty Paid..... | .45 | .50 | .50 | .60 | .70 | .85  | 1.15 | 1.75 |

22332. Reagent Bottles, Wide Mouth, otherwise same as above.
- | Capacity, cc.....    | 50  | 100 | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|----------------------|-----|-----|-----|-----|-----|------|------|------|
| Each, Duty Free..... | .30 | .35 | .40 | .45 | .55 | .70  | .90  | 1.30 |
| Each, Duty Paid..... | .45 | .50 | .50 | .60 | .80 | .95  | 1.25 | 1.85 |

Note—While we recommend Bottles as listed under No. 22328 and 22332 as standard, we offer the following alternatives in style, finish, etc.

22336. Alternative I. With upright stoppers at same price as regular No. 22328 and 22332 with flat stoppers.

22340. Alternative II. Of amber or blue glass instead of white, add the following to price of No. 22328 and 22332.

Capacity, cc.....	50 to 100	125 to 1000	2000	4000
Each, Duty Free.....	.02	.03	.05	.08
Each, Duty Paid.....	.03	.04	.08	.10

22344. Alternative III. For desk number on label and stopper, add the following to price of No. 22328 and 22332.

Capacity, cc.....	50 to 100	125 to 1000	2000	4000
Each, Duty Free.....	.03	.06	.06	.08
Each, Duty Paid.....	.05	.10	.10	.12

22348. Alternative IV. For loose fitting glass caps (Fig. 2) add the following to price of No. 22328 (narrow mouth).

Capacity, cc.....	50 to 100	125 to 1000	2000	4000
Each, Duty Free.....	.06	.10	.12	.15
Each, Duty Paid.....	.10	.15	.16	.25

22352. Alternative IV. For loose fitting glass cap, add the following to price of No. 22332 (wide mouth).

Capacity, cc.....	50 to 100	125 to 1000	2000	4000
Each, Duty Free.....	.08	.12	.15	.20
Each, Duty Paid.....	.12	.16	.25	.30

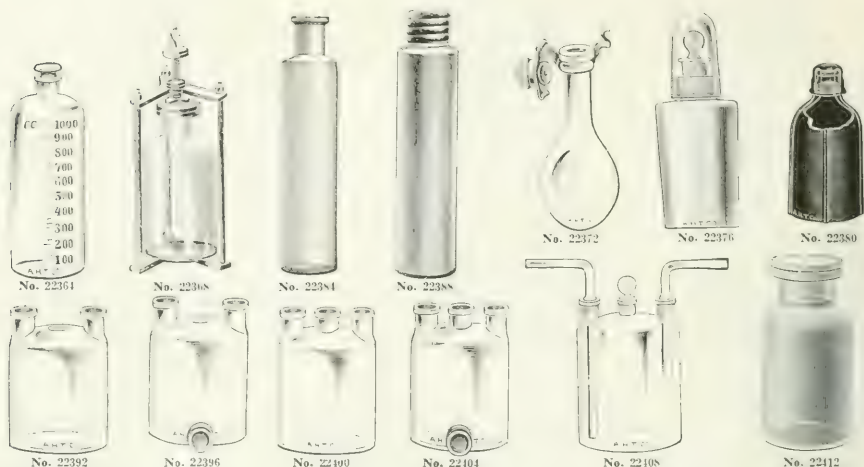
22356. Alternative V. For label like No. 22328 but without chemical symbol deduct the following from price of No. 22328.

Capacity, cc.....	50	100	125	250	500	1000	2000	4000
Each, Duty Free.....	.08	.08	.08	.10	.12	.12	.15	.20
Each, Duty Paid.....	.12	.12	.12	.15	.16	.16	.20	.25

Note—Prices for square or diagonal cut stoppers with and without flange, labels with etched lettering, labels without border, lettering without background, etc., will be sent upon application.

22360. Bottle Caps, of glass, to fit over the stoppers of Reagent Bottles.

Inside diameter of cap, mm.	26	30	35	39	45	49	60
Capacity of bottle, cc.....	30	60	125	250	500	1000	2000
Per ten.....	1.00	1.00	1.00	1.00	1.00	1.50	1.50



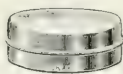
22361.	Bottle, Graduated, of flint glass, with glass stopper. So-called "mixing jar."	Capacity, cc.	250	500	1000
	Each.		1.25	2.00	3.00
22368.	Bottle, Pressure, Lintner, complete with metallic clamp. Capacity 125 cc.				2.75
22372.	" " of heavy glass, with patent stopper.	Capacity, cc.	100	150	200
	Each.		.30	.32	.35
22376.	Bottles, Ether, of glass, with ground in stopper and ground on glass cap, widely used for all volatile liquids. This is a well made imported bottle.	Capacity, cc.	50	100	250
	Each.		.45	.50	.65
22380.	Bottles, Hard Rubber, with paraffine seal and screw cap, for acids.	Capacity, cc.	100	250	500
	Each.		.75	1.00	1.50
22384.	Bottles, Oil Sample, of flint glass, tall, narrow shape.	Capacity, ounces.	1	2	4
	Number in original case.		864	720	432
	Per dozen.		.40	.50	.65
	Per gross in original case.		3.75	4.90	6.50
22388.	Bottles, Oil Sample, same as No. 22384 but with metallic screw cap with cork lining. Capacity 4 oz., length 6 $\frac{3}{4}$ inches, diameter 1 $\frac{1}{8}$ inches. Packed 432 in original cases.				.12
	Each.				1.05
	Per dozen.				10.25
	Per gross in original case.				
22392.	Bottles, Woulff, with two necks.	Capacity, cc.	125	250	500
	Each.		.40	.45	.60
22396.	Bottles Woulff, with two necks and bottom tubulation.	Capacity, cc.	500	1000	2000
	Each.		.80	1.00	1.50
22400.	Bottles, Woulff, with three necks.	Capacity, cc.	125	250	500
	Each.		.45	.50	.65
22404.	Bottles, Woulff, with three necks and bottom tubulation.	Capacity, cc.	500	1000	2000
	Each.		.90	1.20	2.00
22408.	Bottles, Woulff, with three necks, two of which are fitted with ground in glass delivery tubes and one with ground in glass stopper.	Capacity, cc.	125	250	500
	Each.		1.00	1.25	1.60
22412.	Bottles, Water Sample, 2 oz. capacity, with flat ground in stopper. Both bottle and stopper can be numbered with serial number. As used in large quantities in the Filtration Laboratories of the Philadelphia Bureau of Water, etc.	Style.	Plain	Numbered	
	Each.		.25	.30	
	Per dozen.		3.00	3.60	



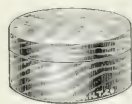
No. 22416



No. 22420



No. 22424



No. 22428



No. 22432

22416.	Boxes of paste board, so called "pill boxes." Covered with fine glazed paper, carmine color.				
	Diameter, inches.....	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$1\frac{1}{2}$
	Depth, inches.....	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
	Per gross.....	.25	.35	.40	.50
	In packages of 1 dozen of each size nested, per package.....				.12
22420.	Boxes of paste board, sliding form, covered with fine white glazed paper.				
	Length, inches.....	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$
	Width, inches.....	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$
	Depth, inches.....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	Per dozen.....	.15	.15	.15	.15
	Per gross.....	1.00	1.00	1.00	1.00
22424.	Boxes, of seamless tin, round form. Convenient for samples and specimens.				
	Capacity, ounces.....	$\frac{1}{2}$	1	2	4
	Per dozen.....	.10	.16	.20	.30
22428.	Boxes, of turned wood. Convenient for samples and specimens.				
	Capacity, ounces.....	$\frac{1}{2}$	1	2	3
	Per dozen.....	.08	.10	.14	.20
22432.	Brush, of bristle, for assay buttons.....				.50



No. 22436



No. 22440



No. 22444



No. 22448



No. 22452



No. 22456



No. 22460



No. 22464



No. 22472



No. 22476

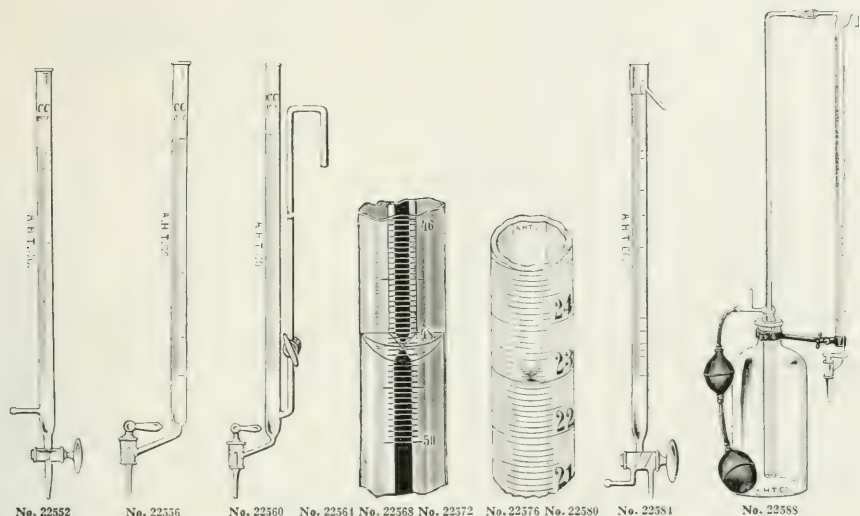


No. 22480

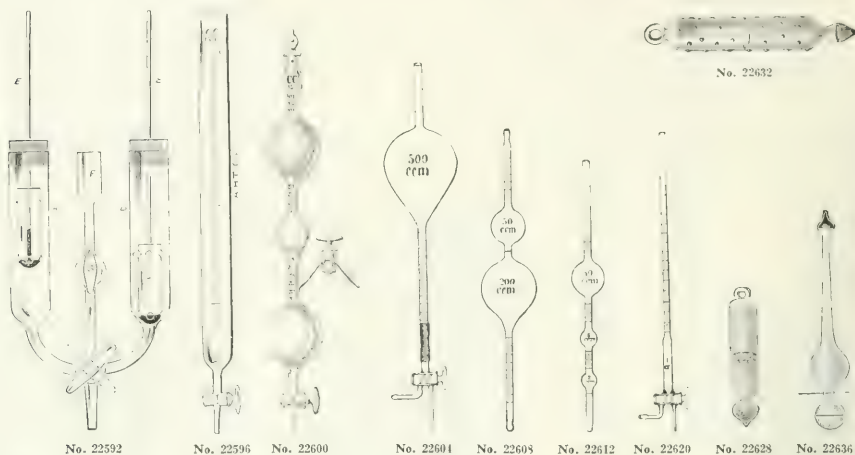
22436.	Brush, of black horse hair, 9 inches long, with wooden handle. For cleaning small cylinders, etc.	.20
22440.	" of black bristle, conical shape, with tuft on end, 12 inches long. For cleaning cylinders, etc.	.30
22444.	" of black and white bristle, conical shape with tufted end, with four rows of bristles. For cleaning large cylinders, jars, etc.	.35
22448.	Brush, of black bristle, 12 inches long. For cleaning cylinders, beakers, etc.	.25
22452.	" of black and white bristle, on wooden handle, with four rows of bristles. For cleaning large jars, cylinders, etc.	.30
22456.	Brush, of black and white bristle, with two tufts on end for reaching corners of large cylinders, jars, etc. With four rows of bristles.	.35
22460.	Brush, for beakers, with long handle of wood.	.20
22464.	Brush, of bristle in wooden handle, flat. Convenient for pasting labels, etc.	
	Width of bristles, inches.....	$\frac{1}{2}$
	Each.....	.05
22468.	Brush, of camel's hair, flat, with wooden handle. For dusting scale pans.	
	Width of hair, inches.....	$\frac{1}{2}$
	Each.....	.15
22472.	Brush, of camel's hair, round, with wooden handle, $\frac{1}{2}$ inch diameter. For dusting scale pans....	.40
22476.	Brush, of camel's hair, bound in quill handle.	
	Length of hair, mm.....	14
	Each.....	.05
22480.	Brush, of camels hair, bound in quill, so-called "camel's hair pencils."	
	Number.....	3
	Size.....	Small Medium Large
	Per dozen.....	.20 .25 .35



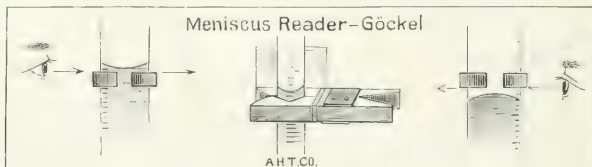




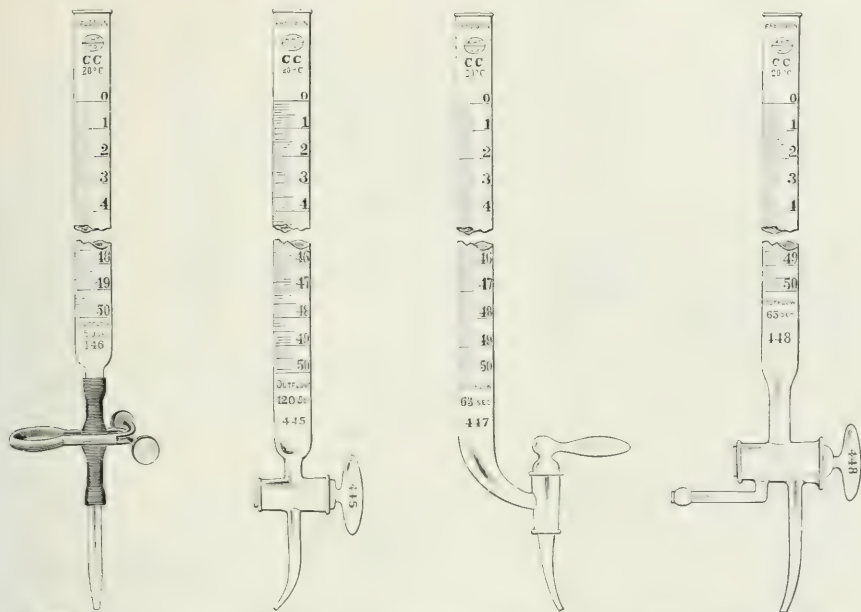
22552.	Burettes, with straight glass stopcock, with side tube for refilling.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	1.50	2.00	2.65	
22556.	Burettes, with glass stopcock set on at an angle.				
	Capacity, cc.....	25	50	75	100
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
	Each.....	1.35	1.85	2.25	2.50
22560.	Burettes, with glass stopcock set on at an angle and side tube for refilling with glass stopcock in same				
	Capacity, cc.....	25	50	75	100
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
	Each.....	3.25	4.25		
22564.	Burettes, for pinchcock, same shape as No. 22528 but with dark blue enamelled stripe on white back-				
	ground for accurate reading of meniscus. See sectional illustration.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	1.50	2.50	3.50	
22568.	Burettes, same as No. 22564 but with straight glass stopcock.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	2.00	2.50	3.50	
22572.	Burettes, same as No. 22564, but with three way glass stopcock.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	2.25	3.00	4.25	
22576.	Burettes, for pinchcock, same shape as No. 22528 but with two sides white enamelled with transparent				
	vertical stripe behind graduations for accurate reading of meniscus. See sectional illustration.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	1.50	2.50	3.50	
22580.	Burettes, same as No. 22576 but with straight glass stopcock.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	2.50	3.50	4.50	
22584.	Burettes, Automatic, with three-way stopcock, zero point and overflow cup, with dark blue enamelled				
	stripe on white background for accurate reading as in 22564.				
	Capacity, cc.....	25	50	100	
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	
	Each.....	3.50	4.50	5.25	
22588.	Burette Automatic Zero, Squibb's latest form filled by pressure from rubber bulb. All joints are ground				
	air-tight and price is for the complete apparatus with bulbs, reservoir, clamp and burette; with				
	dark blue enamelled stripe on white background for accurate reading.				
	Capacity, cc.....	25	50		
	Graduated in cc.....	$\frac{1}{10}$	$\frac{1}{10}$		
	Each.....	6.00	7.50		



22592.	<b>Burette Rose Automatic Adjustable</b> (Patent applied for). For repeated delivery of definite quantities. Automatically delivers the quantity at which it is set and cannot overflow. The quantity to be delivered can be quickly changed. Specially recommended for nitrogen determinations by Kjeldahl method, fiber determinations, fat determinations in milk analysis by Babcock method, for lead acetate solution in sugar determinations, for solvents in ore and soil laboratories and for the dispensing of nutrient solution and culture media in bacteriological laboratories. See <i>Journal of the American Chemical Society</i> , May, 1910. Measuring tubes 35 x 200 mm giving an approximate delivering capacity of 182 cc each. ....	6.00
22596.	<b>Burettes, Dispensing, wide form with glass stopcock.</b>	
	Capacity, cc.....	250 500 1000
	Graduated in cc.....	5 10 25
	Each.....	3.00 3.50 4.00
22600.	<b>Burette Saponification (Sapometer), Huggenberg.</b> See <i>Seifensiederzeitung</i> 1903, S. 795.....	7.00
22604.	<b>Burette, Morse, for calibrating flasks, pipettes, burettes, etc., 500 cc.</b> .....	6.00
22608.	" " " " as above, 50 cc and 200 cc.....	6.00
22612.	" " " " " 50 cc, 3 cc and 2 cc.....	6.00
22616.	<b>Two-way Stopcock</b> for use with above as shown in illustration of No. 22604.....	3.00
22620.	<b>Burette, Morse, 1 cc, for small quantities, with stopcock attached.</b> .....	6.00
22624.	<b>Burette Caps, of glass.</b> Outside diameter of burette must be given in ordering.	
	To fit burettes, cc.....	25 50 100
	Each.....	.05 .08 .10
22628.	<b>Burette Float, Erdmann</b> .....	.25
22632.	" " <b>Vollhardt</b> , with glass points to prevent sticking to walls of burette.....	.40
22636.	" " <b>Beutel</b> .....	.35
22640.	<b>Burette Funnel.</b> A small glass funnel convenient for use in filling burettes.....	.10



22644.	<b>Burette Meniscus Reader, Göckel.</b> With glass plate.....	.75
22648.	" " " " Without glass plate.....	.60



No. 22660 No. 22676

No. 22664 No. 22680

No. 22668 No. 22684

No. 22672 No. 22688

**BURETTES, PRECISION**, graduated by weighing at 20° C. in accordance with the specifications of the Physikalisch-Technische Reichsanstalt, i. e., with individual control number, time of outflow, all around graduations for the whole centimeters and semi-circular graduations for the fractions, etc. These burettes are offered with our unofficial factory certificate and also with the Physikalisch-Technische Reichsanstalt certificate and control stamp, i. e., the official certificate of the German government.

#### Precision Burettes with Unofficial Factory Certificate

These certificates are made out in the factory in exact accordance with the methods prescribed by the Physikalisch-Technische Reichsanstalt and no burette is certified unless the error falls within the limit permitted by the Physikalisch-Technische Reichsanstalt. The data on these certificates may be used as a check where burettes are calibrated in the laboratory or with entire reliance upon the accuracy of the figures given.

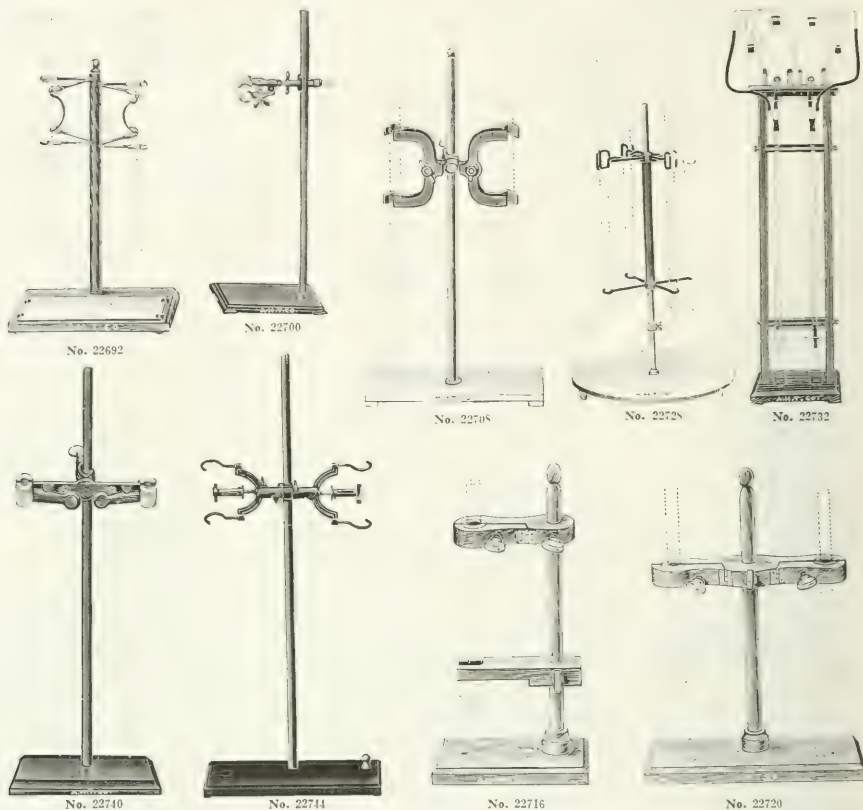
22660.	Burettes, Precision, with pinchcock, rubber tubing and glass tip, graduated in accordance with the requirements of the P. T. R. at 20° C. and with unofficial factory certificate.			
	Size.....	25 cc in $\frac{1}{10}$ ths	50 cc in $\frac{1}{10}$ ths	100 cc in $\frac{1}{10}$ ths
	Each.....	1.75	3.00	4.00
22664.	Burettes, Precision, with straight glass stopcock, graduated in accordance with the requirements of the P. T. R. at 20° C. and with unofficial factory certificate.			
	Size.....	25 cc in $\frac{1}{10}$ ths	50 cc in $\frac{1}{10}$ ths	100 cc in $\frac{1}{10}$ ths
	Each.....	2.70	4.00	6.00
22668.	Burettes, Precision, with glass stopcock set on at an angle, graduated in accordance with the requirements of the P. T. R. at 20° C. and with unofficial factory certificate.			
	Size.....	50 cc in $\frac{1}{10}$ ths	100 cc in $\frac{1}{10}$ ths	
	Each.....		4.00	6.20
22672.	Burettes, Precision, with three way glass stopcock, graduated in accordance with the requirements of the P. T. R. at 20° C. and with unofficial factory certificate, size 50 cc in $\frac{1}{10}$ ths.			4.60

#### Precision Burettes with official Physikalisch-Technische Reichsanstalt Certificate

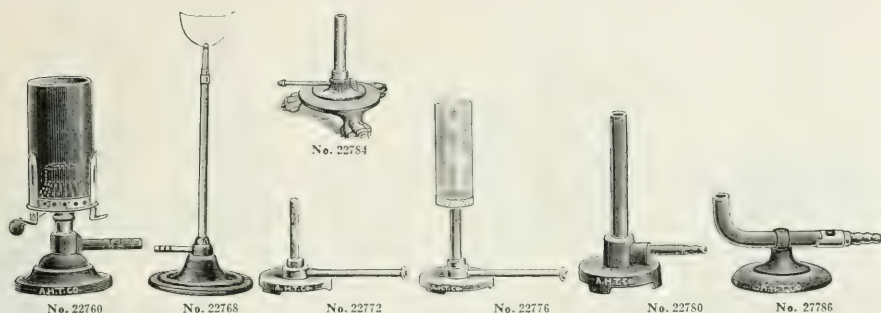
These Burettes are exactly the same as those described above in workmanship and accuracy but are furnished with the P. T. R. certificate and control stamp, for which a higher price must be charged because of the German government fee.

22676.	Burettes, Precision, with pinchcock, rubber tubing and glass tip, with P. T. R. certificate.			
	Size.....	25 cc in $\frac{1}{10}$ ths	50 cc in $\frac{1}{10}$ ths	100 cc in $\frac{1}{10}$ ths
	Each.....	5.25	6.15	7.85
22680.	Burettes, Precision, with straight glass stopcock, with P. T. R. certificate.			
	Size.....	25 cc in $\frac{1}{10}$ ths	50 cc in $\frac{1}{10}$ ths	100 cc in $\frac{1}{10}$ ths
	Each.....	6.15	7.00	9.65
22684.	Burettes, Precision, with glass stopcock set on at an angle, with P. T. R. certificate.			
	Size.....	50 cc in $\frac{1}{10}$ ths	100 cc in $\frac{1}{10}$ ths	
	Each.....		7.00	9.65
22688.	Burettes, Precision, with three-way glass stopcock, 50 cc. in $\frac{1}{10}$ ths; with P. T. R. certificate.			7.85

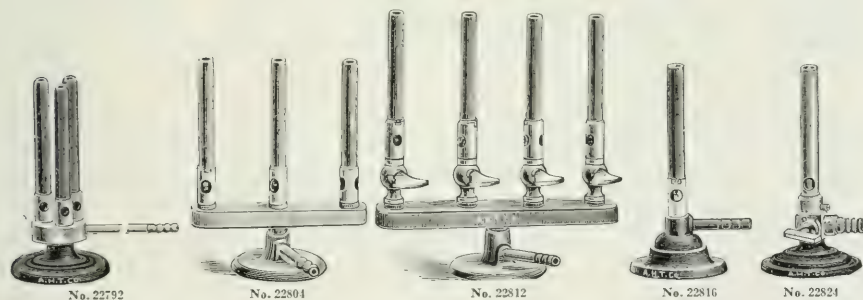




22692. Burette Support, Chaddock, with rubber lined wire clamps for holding the burette which is readily placed in position or removed by simply springing back the wire. The rod and base are of polished wood and a piece of milk white glass is fastened on the base. For two burettes... 1.50
22696. Burette Support, same as above, but for one burette... 2.50
22700. Burette Support, consisting of rectangular base No. 3760S, medium size and adjustable clamp No. 24534... .80
22704. Burette Support, consisting of porcelain base No. 37680 and brass clamp for one burette, No. 24554... 5.25
22708. Burette Support, consisting of porcelain base No. 37684 with brass rod in center and brass clamp No. 24558 for two burettes... 7.00
22712. Burette Support, of wood, with cork lined clamp, for one burette... 1.00
22716. " " " " same as above but with an extra arm to keep the burette steady... 1.40
22720. " " " " with cork lined clamp, for two burettes... 1.25
22724. " " " " same as No. 22720 but with double arm to keep the burettes steady... 1.50
22728. " " " " with round porcelain base, brass rod adjustable as to height and revolving clamps, for four burettes... 7.50
22732. Titration Outfit, consisting of wooden support and two burettes, 2 aspirating bottles of 1 liter capacity and rubber connections, pinchcocks, etc., as shown in illustration. Complete... 8.25
22736. Support, only, without glassware... 6.00
22740. Burette Support, consisting of rectangular base No. 37672 with rod in center and No. 24542 clamp for two burettes... 1.25
22744. Burette Support, consisting of automatic burette clamp No. 24570 for two burettes and new form of support permitting the use of same in the vertical position and also in a horizontal position by hanging the base plate on the wall by means of aperture provided... 3.75
22748. Burette Support, as above but for one burette... 5.00



22760.	Burner, Argand, with lava lip and sheet iron chimney. Flame is adjustable and can be turned very low.	1.00
22764.	Glass Chimney for use with No. 22760 Burners, with clamp to attach to burner.	.15
22768.	Burner, consisting of an ordinary gas jet with 12 inch stem on heavy iron base. Very convenient in laboratory.	1.00
22772.	Burner, Micro, for obtaining a small flame; 2½ high, nickel plated, with long inlet tube. Very suitable for use with paraffine baths, etc.	.50
22776.	Burner, Micro, same as No. 22772 but with glass chimney.	1.00
22780.	Burner, with circular draft; without air regulator; will not clog because of any substance falling in tube. Height 5 inches, diameter of tube ⅜ inch.	.35
22784.	Burner, Micro, consisting of a brass tube on bronze base with air inlet underneath, height 3 inches, diameter of tube ⅜ inch. A very convenient and economical burner for the laboratory table where great heat is not required.	.25
22786.	Burner, Bunsen, low form. Height 3 inches diameter of tube ⅜ inch.	.50
22787.	low form, same as No. 22786 but larger and heavier. Height 4½ inches.	
	Diameter of tube.	1
Each.		1.30 1.50 1.75 3.00



22788.	Burner, Bunsen, multiple, with two tubes.	1.25
22792.	“ “ “ “ three “	1.50
22796.	“ “ “ “ four “	2.00
22800.	“ “ “ “ six “	2.75
22804.	“ “ “ “ three tubes in straight line.	2.00
22808.	“ “ “ “ four “ “ “ “	2.40
22812.	“ “ “ “ “ “ “ “ “ with individual stopcocks.	4.50
22816.	Burner, Bunsen, with laquered brass air regulator. This is a superior burner to the ordinary Bunsen in both construction and finish. Height 6 inches, diameter of tube, ⅜ inch.	.25
22820.	Burner, Bunsen, same construction as No. 22816 but with tube ½ inch in diameter giving a much larger flame.	.40
22824.	Burner, Bunsen, with pilot flame and stopcock.	2.00





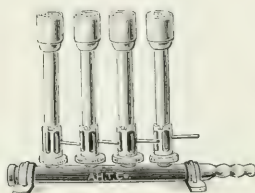
No. 22896



No. 22900



No. 22904

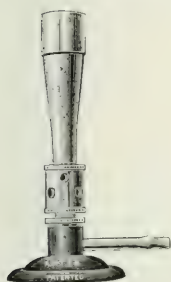


No. 22908



No. 22912

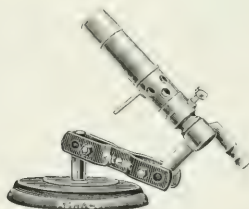
22896.	Burner, Teclu, with regulator for gas and air, gives a large and powerful flame.			
	Height, inches.....	6	7½	
	Diameter of tube, inches.....	½	¾	
	Each.....	1.25	2.00	
22900.	Burner, Fletcher Safety, of brass with gauze top to prevent striking back.	Complete with brass base.		
	Height, inches.....	4½	5½	7
	Diameter at top, inches.....	1½	1½	1½
	Each.....	2.15	2.60	3.10
22904.	Burner, High Temperature, a new burner of the grid top type with gas and air regulation. Equal in performance to any burner of this type.	1.00	1.50	2.00
	Diameter of top, inches.....	¾	1	1½
	Each.....	1.00	1.50	2.00
22908.	Burner, Quadruple, High Temperature, consisting of four high temperature burners as above mounted on base with supply pipe.			15.00
22912.	Burner, Sargent's High Temperature, a burner of the grid type, with adjustment for gas and air, with large tube and grid top.			
	Diameter of grid top, inches.....	1	1	1½
	Each.....	1.00	1.50	1.75



No. 22916



No. 22920



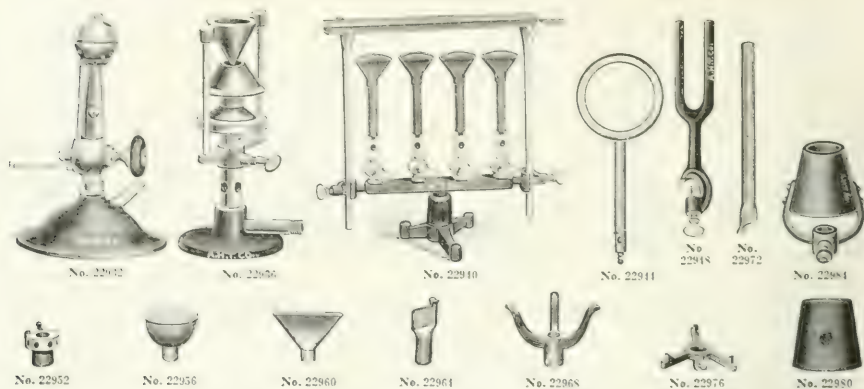
No. 22924



No. 22928

22916.	Burner, Scimatco Patent. Constructed upon the Meker principle with a metal grid $\frac{3}{4}$ inch deep at top. Adjustable for both gas and air and can be used with any kind of gas.			
	Diameter of flame, mm.....	25	30	
	Each.....	2.10	2.50	
BURNERS, BLUE FLAME, for high temperatures with great economy of gas. This is the latest development of the grid top type of burner, giving greatly increased heating power and an absolutely homogeneous flame, all of which is available for heating from the top of the burner to the extreme point. The gas regulating device permits its use with any quality of gas delivered at any pressure and permits regulation from the maximum to the smallest flame without back-firing. This burner is supplied in five sizes and also on adjustable support and with blast attachment. With blast attachment a temperature exceeding 1700°C is obtained.				
22920.	Burner, Blue Flame, as above described.			
	Diameter of grid top, mm.....	19	22	25
	Each.....	1.00	1.60	2.00
22924.	Burner, Blue Flame, as above, but with patent universal joint for maintaining the burner in vertical, horizontal or inclined position.			
	Diameter of grid top, mm.....	19	25	
	Each.....	3.00	4.00	
22928.	Burner, Blue Flame, as above, with blast attachment.			
	Diameter of grid top, mm.....	22	31	43
	Each.....	2.50	3.80	5.00

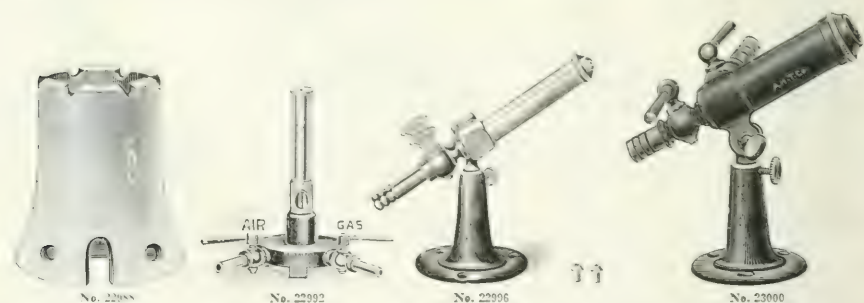




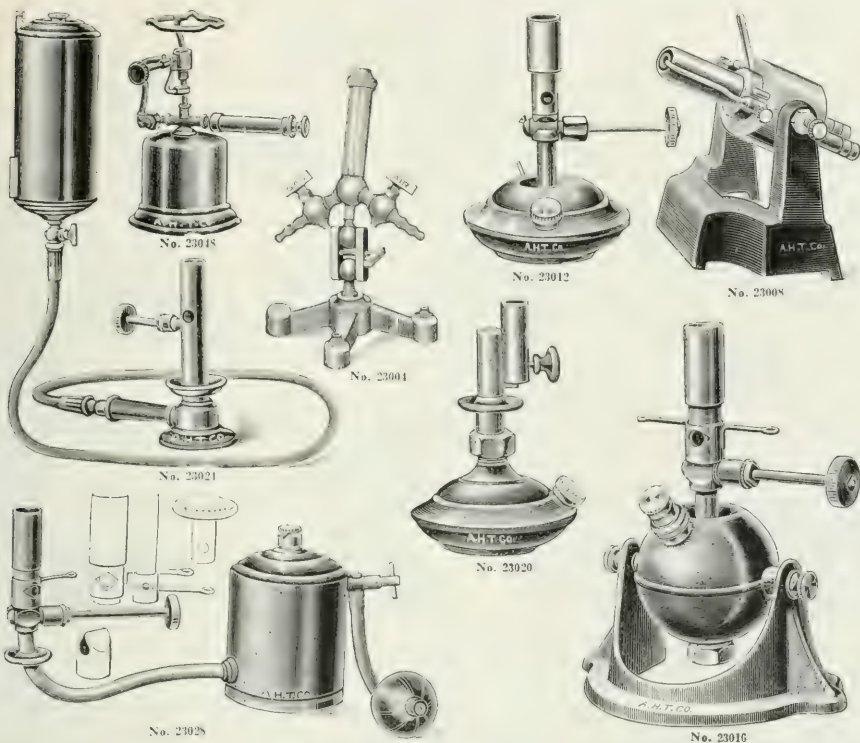
22932.	Burner, Eureka, self-lighting, height 6½ inches, diameter of flame tube ¾ inch.....	2.00
22936.	Burner, Greenman, for use with the Greenman Thermo-regulator.....	9.00
22940.	Burner, Quadruple, for combustion tubes, each burner with air regulator, stopcock and wing tip, with adjustable support for the combustion tube.....	7.50
22944.	Burner, Bunsen Ring Form. For use on apparatus support for heating funnels, flasks, etc. With air regulator.	
	Diameter of ring, inches.....	3 4 5 6 8
	Each.....	1.25 1.50 1.75 2.00 2.50

#### Burner Attachments

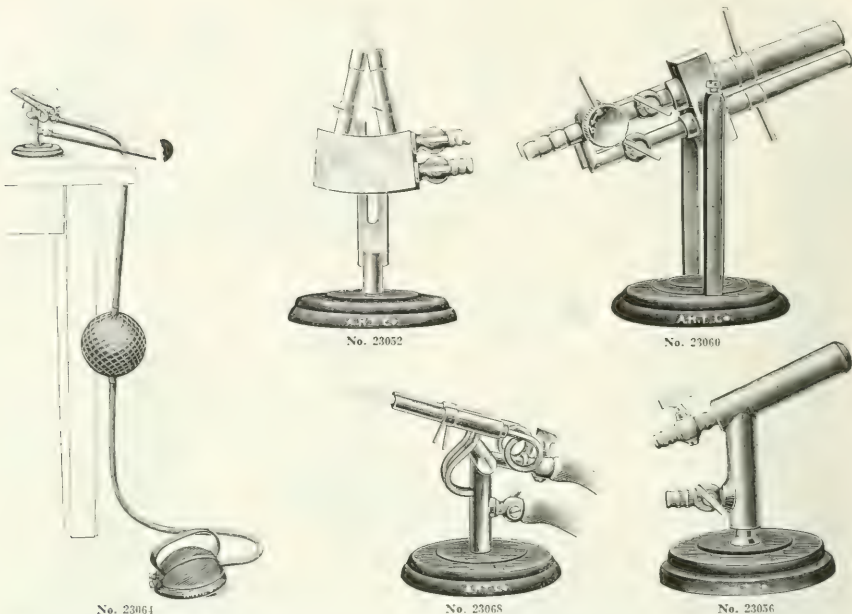
22948.	Support, fork shaped, for attaching to support. To hold Bunsen Burners.....	.25
22952.	Crown Top for Burners, giving round flame, Suitable for heating small dishes.....	.40
22956.	Gauze Top for Burners, giving large round flame.....	.25
22960.	Wing Top for Burners, giving a broad flat flame very suitable for bending glass tubing.....	.10
22964.	Blowpipe Tip for Burners, giving a flat flame, with rest for blowpipe.....	.15
22968.	Tripod for Burners, for supporting small dishes, etc., directly over flame.	
	Size.....	Small Large
	Each.....	.15 .20
22972.	Tube for Burners, to fit inside of the burner for giving yellow flame for blowpiping.....	.15
22976.	Star for Burners, to support chimney, etc.....	.20
22980.	Chimney of metal, for use on burners in connection with star No. 22976.....	.10
22984.	“ of iron, with support attached.....	.40



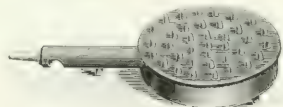
22988.	Guard for Burners, of vitrified earthenware, 9 inches high, 8 inches diameter at bottom and 5 inches diameter at top. Protects the flame from drafts and forms a rigid non-corrosive support.....	.35
22992.	Burner, Bunsen Blast, with separate cocks for blast and gas supply. The blast is directed at the mouth of the burner by a small tube which aids as a powerful blowpipe. Can be used as an ordinary Bunsen burner and blast turned on only when desired. Height 6½ inches.....	3.50
22996.	Burner, Bunsen Blast, for use with gas and air pressure, new pattern. On adjustable stand with separate cocks for blast and gas, and with three tips.....	3.50
23000.	Burner, Bunsen Blast, improved form, extra large size for use with gas and air blast. On adjustable stand with two tips.....	8.00



23004. **Burner, Blast**, French form. mounted on universal joint on tripod, with separate cocks for gas and pressure. 5.00
23008. **Burner, Compound Blast**. An improved Burner of the Fletcher type, furnishing a flame from a finely pointed jet to a large powerful blast. One lever adjusts air and gas automatically. With pilot light. 10.00
23012. **Burner, Barthel, Automatic**, for benzene. Burns 90 minutes with full flame on one charge. Will melt copper wire 3 mm in diameter in 45 seconds. Use benzene from sp. gr. 0.67 to 0.71. 4.50
23016. **Burner, Barthel, Automatic**, for benzene, on tilting mount. Burns two hours with full flame on one charge. Melts copper wire 4 mm diam. in 1½ minutes. Flame may be placed at any angle. Very convenient for bending glass tubing, etc., in the laboratory. Use benzene of sp. gr. 0.67 to 0.71. 8.00
23020. **Burner, Barthel Automatic**, for alcohol. Burns 90 minutes with blue, smokeless flame on one charge. Melts copper wire 3 mm diameter in 1½ minutes. 4.00
23024. **Burner, Barthel Automatic**, for alcohol. Produces a perfectly blue flame without smoking somewhat hotter than the flames of ordinary gas burners. Considered the best alcohol burner made. Price includes burner, 5 ft. of metallic tubing and reservoir.
- | Size..... | Small | Medium | Large. |
|-----------|-------|--------|--------|
| Each..... | 6.00  | 8.50   | 10.00  |
23028. **Burner, Barthel Automatic**, for benzene. A blast burner with perfect combustion giving a temperature of about 1400° C. This burner is smokeless and odorless and absolutely safe. Used with flame tubes of three sizes producing a benzene blast or cooking flame. Regularly furnished with medium size flame tube—21 mm diameter. 7.50
23032. **Extra Flame Tubes for No. 23028 Burner.** Number..... 1 2 4
- | Each.....   | .50 | .70 | 1.00 |
|---|-----|-----|------|
| 23036. <b>Rose Top Burner for No. 4 Tube.</b> .....   |     |     | 1.00 |
| 23040. <b>Wing Top Burner to fit any size tube.</b> .....   |     |     | .25  |
| 23044. <b>Burner, Barthel Automatic</b> , for Benzene, as above but with metallic force pump and pressure gauge. 9.50   |     |     |      |
| 23048. <b>Burner, Blast</b> , for gasoline. With flame adjustable from very small to five or six inches. Will burn about 1½ hours at full blast on one charge. With swivel burner and removable tripod. Reservoir 3½ x 4 inches, capacity 1 pint. Nickel plated. 4.75 |     |     |      |



23052. **Burner, Blast**, with two darting needle point flames, for sealing vials, ampoules, serum tubes, etc. On heavy base with adjustment for gas and air and for use with flame in vertical position. . . . 6.00
23056. **Burner, Blast**, Thüringian glass-blower's model, with ball bearing socket, on heavy base, all parts hard soldered, with gas tube of 7 mm. . . . . 3.50
23060. **Burner, Blast, Janus Improved**, as used in the German glass blowing industry for making stopcocks, Roentgen tubes, etc. A very practical blast burner for chemical laboratories as by a simple turn either a thin needle pointed flame or a large roaring flame of varying sizes, is obtained. Each burner tube has independent regulation for gas and air and one may be operated independently of the other. Diameter of large tube 7 mm, of small tube 5 mm. . . . . 10.00
23064. **Burner, Blast**, double tube, with foot blower. A new form designed particularly for the sealing of vials, ampoules and tubes containing various biological products where instantaneous sealing is important. The ordinary blast burner is unsatisfactory for this purpose because of the improper shape and size of the flame and its unsteadiness, noise and great consumption of gas and air. This new burner has two darting needle point flames which meet and form one blade shaped flame which instantly seals small tubes. By regulation of the gas and air this blade shaped flame can be retained at any desired length. In sealing 1 cc ampoules only  $\frac{1}{3}$  cu. ft. of gas per hour is required. The use of this burner permits the sealing of the ampoules so quickly that no heat reaches the contents, an important feature where the vial or ampoule contains camphor, ether or concentrated solutions easily carbonized or with chemicals of a low boiling point such as ether, ethyl chloride, etc. With small foot blower and bulb as shown in illustration. . . . . 10.00
23068. **Burner, Blast**, only as above, without blower or bulb. . . . . 5.00



No. 23072



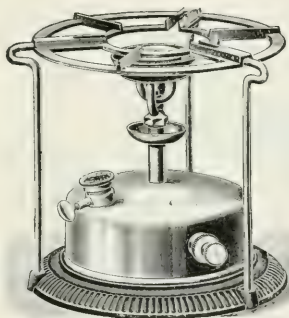
No. 23076

23072. **Burner, Evaporating**, of cast iron. Very convenient for heating glass and porcelain vessels as no cold air can reach the hot part of the dish. Flames are blue and smokeless
- |                  |      |      |                 |
|------------------|------|------|-----------------|
| Diameter, inches | 4    | 5    | 6 $\frac{1}{2}$ |
| Each             | 1.00 | 1.25 | 2.00            |
23076. **Burner, Evaporating**, same as No. 23072 but made of solid copper with lap joints joined without solder.
- |                  |      |      |                 |
|------------------|------|------|-----------------|
| Diameter, inches | 4    | 5    | 6 $\frac{1}{2}$ |
| Each             | 1.50 | 2.00 | 2.50            |

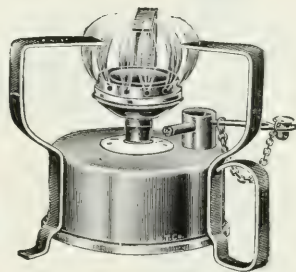




No. 23080



No. 23084

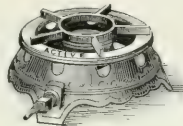


No. 23092

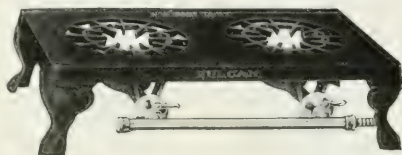
23080. Burner, Dangler, for gasoline. Under ordinary pressure a temperature of 1100° F. is obtained. Complete with copper reservoir..... 8.00
23084. Burner, Hydro Carbon, burning vaporized kerosene which is automatically generated as fast as needed from ordinary kerosene; gives a hot blue flame without smoke or smell; height 8½ inches, diameter of base 9 inches. Without stand as shown in illustration..... 4.00
23088. Stand, for above burner, with top 8½ inches in diameter..... .50
23092. Burner, Alcohol, of brass, nickel plated; guaranteed to be smokeless, odorless and safe; will boil 1 quart of water in 8 minutes; dimensions 4½ x 4½ x 8 inches..... 1.00



No. 23096

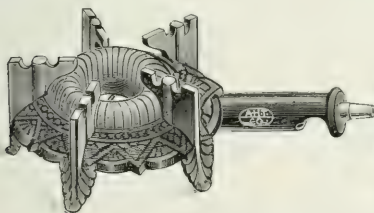


No. 23104



No. 23108

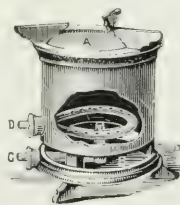
23096. Burner, Gas, 3½ inches high, 6 inches in diameter. For ordinary or gasoline gas. Please specify in ordering..... .60
23104. Burners, Gas, of cast iron, low form, 4½ inches high, fitted with double burner.
- |                       |      |      |      |
|-----------------------|------|------|------|
| Diameter, inches..... | 6½   | 7½   | 8½   |
| Each.....             | 1.00 | 1.15 | 1.25 |
23108. Burner, Gas, with two radial burners and rings set flush with smooth top. Dimensions of top 11½ x 21 inches. For ordinary or gasoline gas. Please specify in ordering..... 3.00



No. 23112



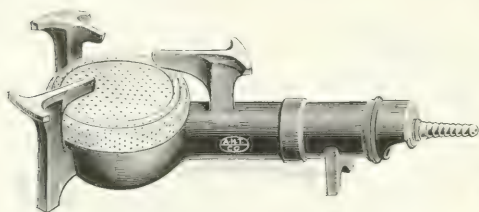
No. 23120



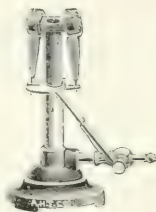
No. 23124

23112. Burner, Fletcher Radial. Made entirely of annealed cast iron, giving a solid flame when in use without tendency to run to a point in the center. Convenient for general laboratory work.
- |                       |      |      |
|-----------------------|------|------|
| Diameter, inches..... | 3½   | 5    |
| Each.....             | 1.50 | 2.00 |
23116. Burner, same as No. 23112 but with cap-nut regulator. For use with gasoline gas.
- |                       |      |      |
|-----------------------|------|------|
| Diameter, inches..... | 3½   | 5    |
| Each.....             | 1.80 | 2.30 |
23120. Burner, Low Form, extra large, with gauze top; height 5 inches, diameter of gauze 2½ inches, length 14 inches. A very powerful burner..... 2.00
23124. Burner, for Low Temperatures, adjustable from a gentle current of warm air to a clear red heat, dispensing with the use of sand baths, water baths, etc., and well adapted for drying, evaporating, boiling, etc. For very low temperatures the ring must be lighted through opening "B."
- |            |                        |                     |
|------------|------------------------|---------------------|
| Style..... | Without Blast Pipe "C" | With Blast Pipe "C" |
| Each.....  | 1.75                   | 2.00                |

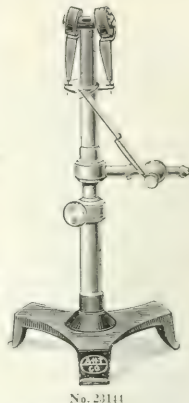




No. 2312



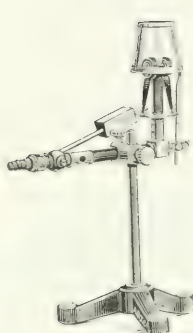
No. 2314



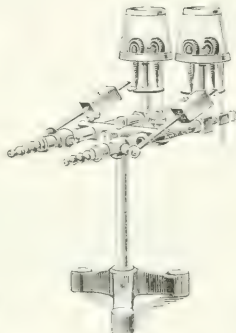
No. 2314



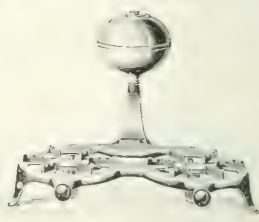
No. 2315



No. 2314



No. 2315

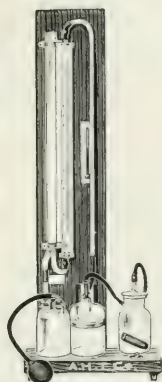


No. 2316

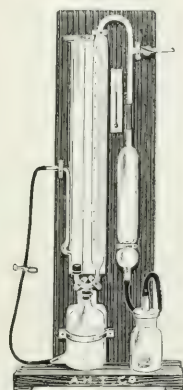
- 2312S. **Burner, Fletcher's Solid Flame.** Will boil quickly four or five gallons of water or keep a small vessel boiling steadily by simply turning the gas low.  
Diameter of flame surface, inches..... 3½ 4½  
Each..... 1.00 2.00
23132. **Burner, same as No. 2312S but with cap-nut regulator.** For use with gasoline gas.  
Diameter of flame surface, inches..... 3½ 4½  
Each..... 1.30 2.30
23136. **Extra Perforated Copper Cap** for use with Burners No. 2312S and No. 23132.  
Diameter, inches..... 3½ 4½  
Each..... .30 .35
23140. **Burners, Koch Safety.** With automatic stopcock to close off the gas when flame is extinguished. Of improved construction with spring control and very superior to those in general use. With threaded inlet for attachment of flexible metallic tubing.  
Height, inches..... 5 6  
Diameter of tube, inches..... 1½ 1½  
Each..... 5.00 6.50
23144. **Burners, Koch Safety.** Same as No. 23140 but adjustable for height.  
Height, inches..... 9 10  
Adjustable to, inches..... 13 14  
Each..... 7.50 8.50
23148. **Burner, Koch Safety,** with weight instead of spring release. On a stand providing both horizontal and vertical adjustment; with mica chimney to protect flame from drafts. Very superior in operation to the imported article of same description and made here because of dissatisfaction with those of foreign make..... 10.00
23152. **Burner, Koch Safety,** same as No. 23148 but with two burners. Complete on adjustable stand and with two mica chimneys..... 17.50
23156. **Flexible Copper Tubing,** specially arranged to connect above Koch Burners with our American Standard Incubators, Paraffine Ovens, etc. With ¼ inch i. p. size coupling at each end which connects with thread regularly supplied on burners and on the connecting tubes of our American Standard Incubators..... 1.00
23160. **Burner, Barthel,** for denatured alcohol; enamelled finish, with brass reservoir; smokeless, economical and a satisfactory substitute for the gas stove in laboratory work where no gas supply is available. With one burner..... 4.50
23164. **Burner, Barthel,** same as above, with two burners and one brass reservoir..... 8.50



No. 23168



No. 23184



No. 23188

23168. Calcimeter, Scheibler, for the determination of carbonic acid in boneblack, etc. Complete..... 25.00  
 23172. Bottles with special glass stopper with tubulation..... .80  
 23176. Rubber Caps..... .50  
 23180. Balloons of thin rubber..... .65  
 23184. Calcimeter, Scheibler, for the determination of carbonic acid in saturated gases, complete.... 32.00  
 23188. Calcimeter, Scheibler-Finkener, as used for determination of carbonic acid in marble, limestone, etc.; complete with thermometer and barometer..... 28.00



No. 23192



No. 23196



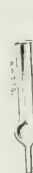
No. 23200



No. 23208



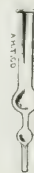
No. 23212



No. 23216

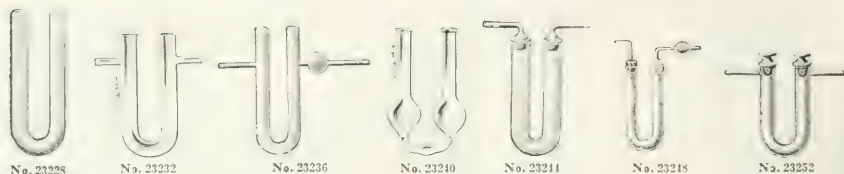


No. 23220



No. 23224

23192. Calcium Chloride Cylinder, narrow mouth, on foot, with tubulature near bottom.  
 Height, mm..... 210 260 315 350 420 470  
 Diameter, mm..... 25 40 45 50 55 75  
 Each..... .50 .60 .75 .90 1.10 1.90  
 23196. Calcium Chloride Cylinder, wide mouth, on foot, with tubulature near bottom.  
 Height, mm..... 210 260 315 350 420 470  
 Diameter, mm..... 25 40 45 50 55 75  
 Each..... .50 .60 .75 .90 1.10 1.90  
 23200. Calcium Chloride Cylinder, with perforated glass stopper and side tubulation at top.  
 Height, mm..... 225 350  
 Diameter, mm..... 40 50  
 Each..... 2.00 2.25  
 23204. Calcium Chloride Glass Support, to prevent the calcium chloride from falling into the lower chamber..... .30  
 23208. Calcium Chloride Holder, for balance cases..... .75  
 23212. Calcium Chloride Drying Tube, La Motte..... .50  
 23216. Calcium Chloride Tubes, straight, with one bulb.  
 Length, mm..... 100 125 150 200 250  
 Each..... .10 .10 .12 .15 .20  
 23220. Calcium Chloride Tubes, straight, with two bulbs. Length, mm..... 100 125 150 200  
 Each..... .10 .12 .15 .20  
 23224. Calcium Chloride Tubes, with two bulbs, and inner tube to collect moisture.  
 Length, mm..... 100 125 150 200  
 Each..... .15 .18 .20 .25



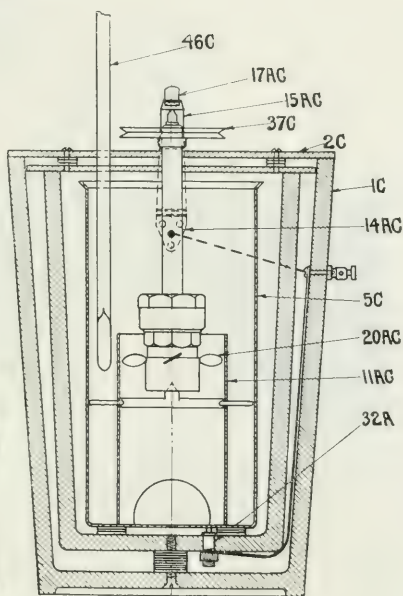
23228.	Calcium Chloride Tubes, U shaped.							
	Length, mm.....	75	100	125	150	175	200	250
	Each.....	.13	.15	.18	.20	.23	.28	.35
23232.	Calcium Chloride Tubes, U shaped, with two side tubes.							
	Length, mm.....				100	120	150	180
	Each.....				.15	.20	.22	.30
23236.	Calcium Chloride Tubes, Vollhardt, with two side tubes and bulb.							
	Length, mm.....						125	150
	Each.....						.30	.35
23240.	Calcium Chloride Tubes, Peligot, with three bulbs.							
	Length, mm.....				100	125	150	180
	Each.....				.30	.35	.45	.60
23244.	Calcium Chloride Tubes, with ground in outlet tubes.							
	Length, mm.....						100	125
	Each.....						.50	.65
23248.	Calcium Chloride Tubes, Marchand.							
	Length, mm.....						100	120
	Each.....						.25	.30
23252.	Calcium Chloride Tubes, Schwartz, with side tubes and perforated glass stoppers.							
	Length, mm.....				100	120	150	180
	Each.....				.90	1.00	1.15	1.50
								1.75



View in Salesroom showing special stands for Distilling Flasks, Retorts, Beakers, Museum Jars, etc.



No. 23300



No. 23300—Sectional View

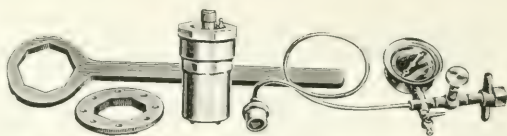
**CALORIMETER, PARR STANDARD.** The marked features of this method are accuracy, simplicity, ease and rapidity of manipulation. The results are absolute and not relative. The operations are such as can be carried on by one not specially skilled in laboratory processes. Oxygen under high pressure or any pressure is not used. The time consumed in conducting a test on a weighed and dried sample should not exceed fifteen or twenty minutes. Sodium Peroxide is used as the combustion medium. The  $\text{CO}_2$  and  $\text{H}_2\text{O}$  formed in the reaction are at once absorbed by the chemical, giving a solid residue instead of gaseous products. It will at once be seen that the apparatus required is simple in construction and easy of manipulation.

23300.	Calorimeter, Parr Standard, as above described complete for Electric Ignition, complete for either lighting circuit or battery, with special thermometer $65-90^\circ \text{F}$ . graduated to $\frac{1}{10}^\circ \text{F}$ . with Bureau of Standards certificate, 2 liter measuring flask, chemical receptacle, measuring cup, 5 inch 100 mesh brass sieve with bottom, chemical sufficient for fifty determinations, pincers, ignition wires reading lens with support, camels hair brush, etc.	75.00
23308.	Reading Lens, for reading the divisions on the thermometer. This lens uses the thermometer stem for its support, thereby maintaining the same angle of vision for all points on the scale, without support.	2.00
23310.	Reading Lens, same as No. 23308 but with support.	3.00
23314.	Bank of Resistance, for use when igniting the charge of the Electric Ignition bomb. The 110 volt outfit includes five lamp sockets, wired up in parallel together with switch and fuse block and for 220 volt two lamp sockets in series and five in parallel, with same accessories.	
	Voltage.....	110 volts      220 volts
	Each.....	5.00      5.50
23318.	Water Motor and support.....	5.00
23322.	Electric Motor, variable speed for either A.C. or D.C. voltage must be specified.....	12.00
23338.	Bomb, Electric Ignition, complete with wrench.....	30.00
23346.	Thermometer, as supplied with the outfit, $65-90^\circ \text{F}$ . in $\frac{1}{10}$ ths with B. of S. certificate.....	10.00
23350.	Special Thermometer, $65-105^\circ \text{F}$ . same as above.....	15.00
23354.	Accelerator, 2 oz. bottle.....	.50
23358.	Barium Oxalate, 2 oz. bottle.....	.50
23362.	Gaskets for bomb, per dozen.....	.25
23366.	Hydrene, 2 lb. can.....	1.75
23370.	Special Chemical, 2 oz. bottle.....	.75
23374.	Sodium Peroxide, a special grade. Size of can.....	$\frac{1}{4}$ lb. $\frac{1}{2}$ lb.      1 lb.
	Each.....	.65      1.25      2.00

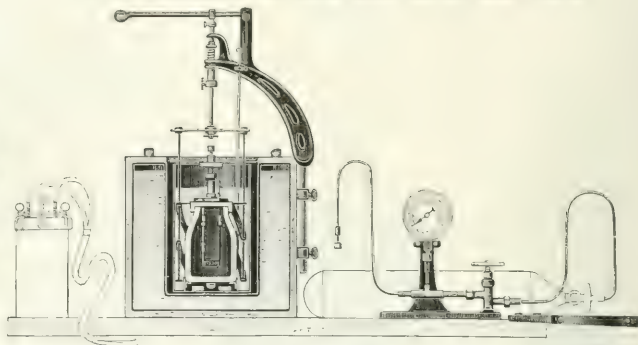




No. 23378



No. 23378 Bomb, assembled with Spanner, Socket, Gauge and Oxygen Connection

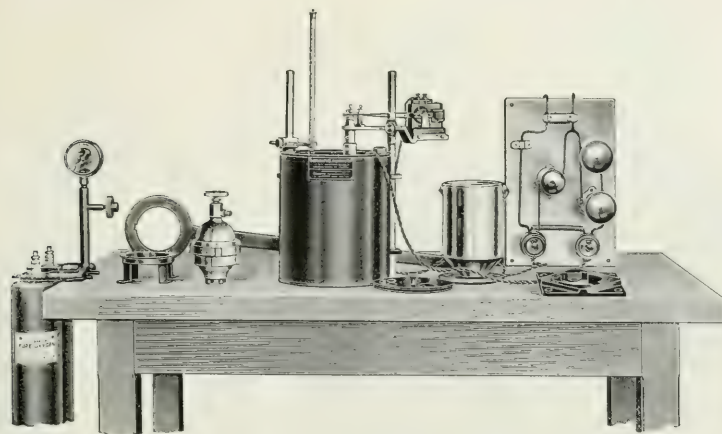


No. 23446

23378. **Calorimeter, Parr Oxygen Bomb.** The new features consist of a bomb of a new acid resisting alloy superior in strength to the best tool steel and which obviates the use of any platinum or enamel lining; the use of rubber gaskets in place of lead and a new automatic oxygen valve. Complete with bomb, water container, insulating vessel with cover, stirrer and pulley, oxygen connection with gauge, needle valve and couplings, octagon holder for bomb, ring support for holding calorimeter covers with thermometer spanner wrench, electric motor with variable speed, direct or alternating, one-half dozen capsules of special alloy, thermometer graduated in  $\frac{1}{20}^{\circ}$  F., with U. S. Bureau of Standards certificate, reading lens and support, special ignition wire and gaskets..... 300.00

#### Accessories for Parr Oxygen Bomb Calorimeter.

23382.	Bomb only. Of acid resisting alloy.....	175.00
23386.	Water Container.....	10.00
23390.	Insulating Vessel with cover, stirrer and pulley.....	45.00
23394.	Oxygen Connection with gauge, needle valve and couplings.....	26.00
23398.	Octagon Holder for Bomb, with spanner wrench.....	10.00
23402.	Electric Motor with variable speed, direct or alternating.....	12.00
23406.	Special Thermometer, as regularly supplied with the outfit, 65-90° F., graduated in $\frac{1}{20}^{\circ}$ F. with U. S. Bureau of Standards certificate.....	10.00
23410.	Reading Lens and support.....	3.00
23414.	Ring Support for holding calorimeter covers with thermometer.....	2.00
23418.	Special Ignition Wire, per card.....	.50
23422.	Large Gaskets for Bomb, per dozen.....	.75
23426.	Small Gaskets for Valve, per dozen.....	.75
23430.	Small Gaskets for Union, per dozen.....	.25
23434.	Beckman's Differential Thermometer, graduated to $\frac{1}{100}^{\circ}$ C. with P. T. R. Certificate of Standardization.....	25.00
23438.	Capsules (special alloy) $\frac{1}{2}$ dozen.....	6.00
23442.	Bench with hinged top and locking device for oxygen cylinder. Blue print for constructing bench will be sent free on request.....	18.00
23446.	Calorimeter, Mahler Bomb, original French make, constructed under the supervision of the author. A standard instrument throughout the world. With enamelled steel bomb, stirring apparatus, platinum tray, etc., but without thermometer, oxygen cylinder and primary battery as shown in illustration. (Price subject to variation because of platinum market). Duty Free.....	248.75
	Stock.....	300.00
23450.	Thermometer, original French make for use with above. + 8 to + 19° C. in $\frac{1}{50}$ ths.....	22.50
23454.	Thermometer as above, + 18 to + 29° C. in $\frac{1}{50}$ ths.....	22.50
23458.	Thermometer as above, + 14 to + 25° C.....	22.50



No. 23470

**CALORIMETER, EMERSON FUEL.** This is a calorimeter of the so-called "bomb" type, with its essential elements of operation the same as the original Berthelot type. It, however, embodies improvements in design over the older types of bomb calorimeters which tend to increase the durability of the instrument and greatly facilitate its operation.

The bomb is made of steel, consisting of two cups joined by means of a heavy steel nut. The two cups are machined at their contact faces with a tongue and groove, the joint being made tight by means of a lead gasket inserted in the groove. The lining is of sheet metal spun to fit the interior. The bomb is made up tight, with a milled wrench or spanner. The pan holding the combustible is of platinum or nickel. The fuse wire should be platinum in general fuel testing. In standardizing the calorimeter by means of cane sugar, benzoic acid, etc., it is necessary to use iron fuse wire.

The jacket is a double walled copper tank, between the walls of which water is inserted. The calorimeter bucket is made as light as possible, of sheet brass.

The stirring device consists of a paddle wheel shaft enclosed in a vertical tube to facilitate its action in circulating the water. The stirrer shaft is driven by a belt from a small motor at the other end of the stirrer bracket. The motor is mounted on a sliding plate which permits of a changing position of same to vary the tension on the belt. This varying tension serves to regulate the speed of the paddle shaft by thus varying the speed of the motor. The stirrer is mounted on a post on the calorimeter jacket, as is the thermometer holder. The motor is driven by a 110 volt circuit and should be placed in series with a 16 c.p. lamp. If so desired, a motor driven by a battery can be specified in ordering the apparatus. The battery motor is driven by a six volt storage battery. The Edison-Leland Type of battery is preferred. These motors designed for the 110 volt power circuit may be driven on the other voltage provided that a proper resistance be placed in series so that the current in the circuit is one-half ampere. The motor may be driven by either direct or alternating current.

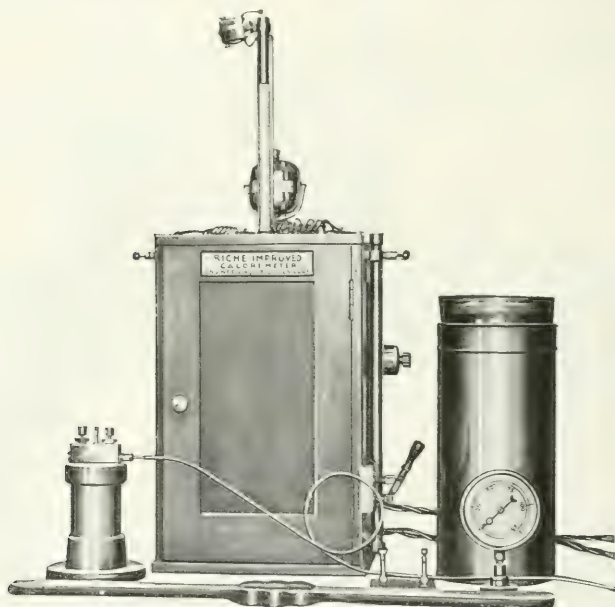
The piping for the insertion of oxygen under pressure is made especially strong and durable. The piping of small internal bore is made of heavy brass. The system is fitted with a hand nipple at one end to make the connection with the bomb, and the other end has a special fitting to grasp the oxygen supply tank. The oxygen piping of the regular Emerson Calorimeter outfit is designed to fit the oxygen cylinders sent out by the S. S. White Dental Mfg. Co. For prices see page 252. Oxygen piping to fit the oxygen cylinders of the Linde Air Products Co. can be specified in ordering the apparatus. The oxygen piping furnished to connect with S. S. White Company's cylinders is designed for two cylinders while that furnished to connect with the Linde Air Product Company's cylinders (which are considerably larger) is designed for only one cylinder. Commercially pure oxygen, free from all traces of combustible gases should be used.

The plate holder or vise is to be used when tightening the nut of the bomb with the spanner.

The table with the rotating top is to hold the bomb when the same is connected to the oxygen piping.

The spanner or wrench is a forging with 30 inch handle and is used to make bomb up with gas tight joint.

23470.	Calorimeter, Emerson Fuel, as described above, complete with steel bomb with spun nickel lining, calorimeter can, double walled calorimeter jacket, heavy piping leading to oxygen supply tank, high pressure gauge, special holder and spanner, stirrer with motor attached (battery drive can be supplied if desired) nickel pan, thermometer holder, gaskets, etc., but without thermometer.....	180.00
23474.	Calorimeter, Emerson Fuel, same outfit as No. 23470 but with gold lined copper cup instead of nickel.....	275.00
22478.	Calorimeter, Emerson Fuel, same outfit as No. 23470 but with platinum lining; (Price subject to market fluctuation of platinum).....	490.00
23482.	Nickel Lining only for Emerson Fuel Calorimeter.....	12.00
23486.	Motor only for Emerson Fuel Calorimeter.....	8.00
23490.	Thermometer, Beckmann, Goetze make, range 5° to 6° C. in 1/10°, without certificate.....	15.00
23494.	Thermometer, as above, with P. L. R. certificate.....	25.00



No. 23500

**CALORIMETER, RICHE IMPROVED ADIABATIC**, designed for use in all branches of calorimetric work, i.e., the presence of heat power in coal, food or other commercial products the values of which are materially altered by impurities. The bomb is of the Kröcker type, provided with two outlets so that carbon determinations can be made. The bomb is supported by a hinged ring which is raised and lowered without touching the fingers in the water. The water jacket for the bomb consists of a vacuum cup which insures both isolation and insulation. The stirrer is of the screw propeller type and the rods are insulated by passing through hard rubber with a hard rubber cap screwed on each end. The vacuum cup containing the water is surrounded by an oak box lined with one inch pressed cork glued to the wood. On the cover, in addition to the cork is glued a piece of hair felt one-half inch thick, effecting a tight joint with the top of the vacuum cup. Ignition of the substance in the bomb is accomplished by a current from three 2-volt storage cells. The current first passes through a 3-ampere fuse wire in series with a platinum wire within the bomb itself. The platinum wire is connected with the substance to be burned by means of a linen thread of sufficient size to secure ignition. In making combustions, the substance to be burned is prepared, weighed and placed in the bomb, which, after being charged with 30 to 40 atmospheres of oxygen, is then placed in the split ring and the wires connected. The water in the vacuum cup is brought to any temperature within  $+ \text{ or } - 5^{\circ}$  of the room temperature. The thermometer is adjusted and the motor started. Readings are then taken until the temperature of the water becomes constant. The sample is then ignited by closing the switch and the readings are taken. The heat absorption is complete when the thermometer shows a constant temperature for three successive minutes. When the bomb is removed and opened and rinsed with water, the rinsings are titrated with  $\frac{N}{10}$  alkali for nitric acid, using litmus as an indicator. This calorimeter may be used with any of the standard bombs now in use. See *Journal of the American Chemical Society*, November, 1913.

23500.	Calorimeter, Riche Improved Adiabatic, complete with thermometer.....	225.00
23504.	“ “ “ “ “ without thermometer.....	215.00
23508.	“ “ “ “ “ “ or gauge.....	210.00
23512.	“ “ “ “ “ “ gauge or accessories.....	150.00



No. 23520

Leeds and Northrup Platinum Resistance Calorimeter Thermometer with Reading Bridge, High Sensibility Galvanometer and Scale in Connection with Emerson Fuel Calorimeter.

# CALORIMETER THERMOMETER, LEEDS & NORTHROP, Platinum Resistance, Bureau of Standards Type.

A platinum resistance thermometer designed to secure an accuracy greater than can be obtained with a mercury thermometer. It is sensitive to temperature changes of .0003°C. or .0008°C. and, therefore, the temperature interval can be read to an accuracy about ten times as great as is possible with mercury thermometers. The bulb of the resistance thermometer is more robust than is a mercury thermometer and is also much quicker in responding to changes in temperature. Its knife-like form, which gives it a maximum of surface with a minimum of volume, practically eliminates thermometer lag. Its range of measurement includes the melting point of ice and the boiling point of water. The electrical method of reading is also well adapted to obtaining radiation corrections through time temperature curves. See "Calorimetric Resistance Thermometers," Bureau of Standards Bulletin, Volume 3.

23520.	Thermometer Outfit, as above, sensitive to .0003°C., consisting of Reading Bridge, uncertified Resistance Bulb, High Sensibility Galvanometer, Lamp and Scale, but without Calorimeter. . . . .	355.00
23524.	Reading Bridge. . . . .	200.00
23528.	Resistance Bulb, uncertified. . . . .	40.00
23532.	" " with certificate of the Bureau of Standards. . . . .	50.00
23536.	High Sensibility Galvanometer. . . . .	90.00
23540.	Lamp and Scale. . . . .	25.00
23544.	Thermometer Outfit, as above, sensitive to .0008°C., consisting of Reading Bridge, uncertified Resistance Bulb, and Galvanometer with Telescope and Scale, but without Calorimeter. . . . .	244.00
23548.	Reading Bridge. . . . .	150.00
23552.	Galvanometer, with Telescope and Scale. . . . .	54.00

Calorimeter Thermometers as above described are used by:

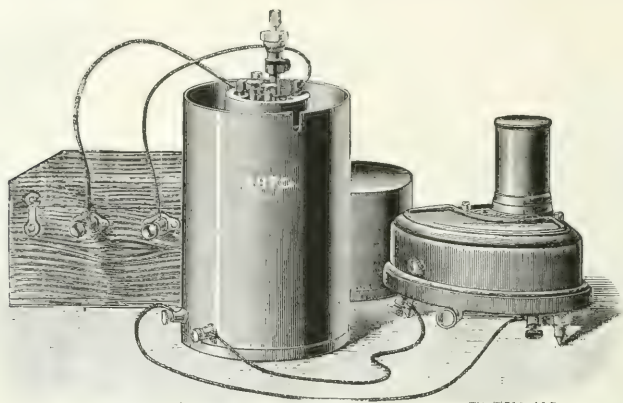
U. S. Bureau of Standards	Armour Institute
U. S. Bureau of Mines	Harvard University
U. S. Department of Agriculture, Nutrition Laboratory	Cornell University Medical College
U. S. Naval Experiment Station	Pennsylvania State College
City of St. Louis	Ohio State University
University of Illinois	University of Chili
Johns Hopkins University	Ottawa Department of Mines
Massachusetts Institute of Technology	Etc., Etc.

# CALORIMETER, ATWATER BOMB, widely used in determining the heating value of feeding stuffs, foods, the adulteration of fats and oils, in addition to coal work. See *Journal of the American Chemical Society*, Vol. XXV, No. 7, July, 1903. The Atwater Bomb Calorimeter can be furnished with complete platinum bomb, at an extra price which must be quoted on application. The regular outfit consists of the following:

Bomb, with rolled gold plated copper lining for shell and with top nickel lined and nickel supports, complete with one dozen nickel capsules (three sizes), tools, ignition wire, gaskets, etc., for use with bomb. . . . .	150.00
Clamp, for holding bomb with spanner. . . . .	15.00
Support, for holding bomb while changing, manometer, and connections. . . . .	16.00
Pellet Press and Mold, complete. . . . .	25.00
Calorimeter Cylinders, complete with water holder, stirrer, thermometer support and electrical connections. . . . .	25.00
Direct Current Motor, with speed reducing gear. . . . .	20.00
Alternating Current Motor, with speed reducing gear. . . . .	22.50
Thermometer Reading Glass. . . . .	6.00
Electric Tapper, for use with thermometer, complete with batteries, push button and wire. . . . .	5.00

23560.	Complete Outfit, consisting of the above, without thermometer, with alternating current motor. . . . .	264.50
23564.	" " " " " " " " direct current motor. . . . .	262.00





No. 23568

CALORIMETER, FÉRY THERMO-

**ELECTRIC**, a new application of the thermo-electric couple to calorimetry, providing the following distinct advantages in the determination of calorific power:—**Direct reading in calories on millivoltmeter scale.**

Omission of water jacket, the steel bomb itself constituting the calorimetric mass.

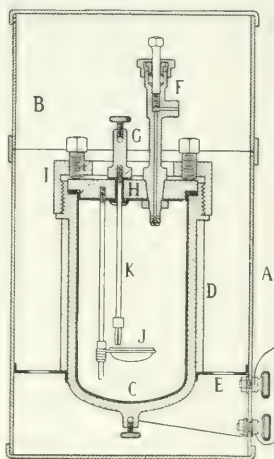
Omission of mercurial thermometer with its attendant difficulty in reading.

Rapidity of determinations, i. e., 15 minutes.

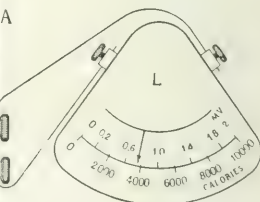
The bomb proper consists of a steel cylinder lined inside with nickel to prevent oxidation and surrounded on the outside with a close-fitting copper jacket "D." The bomb is supported in an outside copper cylinder "A" by means of constantan disc "E." When the millivolt-

meter is connected as shown. The steel bomb, the constantan disc and the outside copper jacket constitute a copper-constantan thermoelectric couple with the hot junction at the point where the constantan disc "E" is joined to the steel bomb and the cold junction at the point where the constantan disc is attached to the outside copper jacket. Experiments at the British National Physical Laboratory and at the Laboratoire National des Arts et Métiers, of France, have shown that with a comparatively constant weight of sample and a uniform oxygen pressure in the bomb the elevation of temperature is proportionate to the calories released in the bomb divided by the weight of the sample in grams and that in a long series of tests the error in readings on benzoic acid were found to be considerably less than 1%. As the needle of the millivoltmeter remains at the point of maximum deviation for about 15 seconds, the readings can be taken with great accuracy. The ignition is accomplished by a hot wire heated by an accumulator of 60 ampere-hour capacity at 4 volts or by a magnet. See *Génie Civil* du 25 Mai 1912.

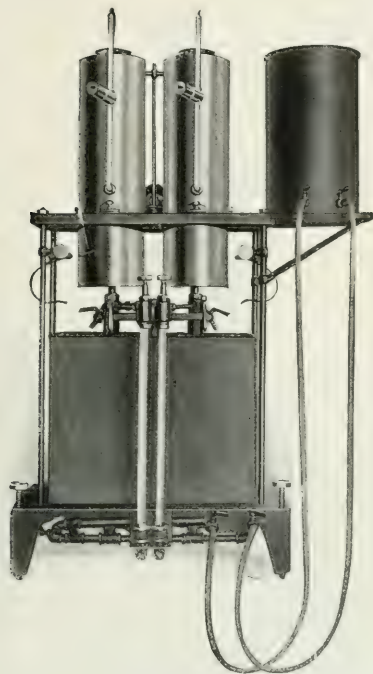
Calorimeter, Féry Thermo-electric, with bomb, copper jacket and millivoltmeter.



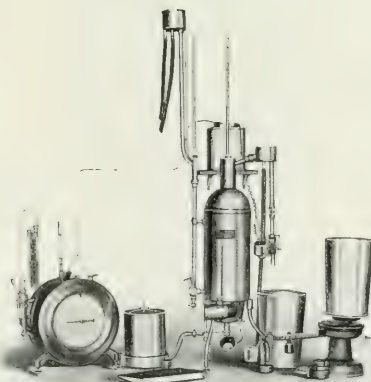
Vertical Section through bomb  
showing connection to  
milli-voltmeter.



23568.	Hour capacity at 4 volts or by a magnet. See <i>Genie Civil du 25 Mai 1912</i> .		
23572.	Calorimeter, Fery Thermo-electric, with bomb, copper jacket and millivoltmeter.		
	Duty Free.....	193.75	Duty Paid..... 232.50
23576.	Manometer, for automatically controlling constant pressure of the Oxygen.		
	Duty Free.....	18.75	Duty Paid..... 22.50
23580.	Pastille Press, with moulds.		
	Duty Free.....	15.00	Duty Paid..... 18.00
23584.	Accumulator, 4 volt, 60 ampere-hours.		
	Duty Free.....	11.25	Duty Paid..... 13.50
23588.	Ignition Magnets, to be used in place of the Accumulator.		
	Duty Free.....	16.25	Duty Paid..... 19.50



No. 23592

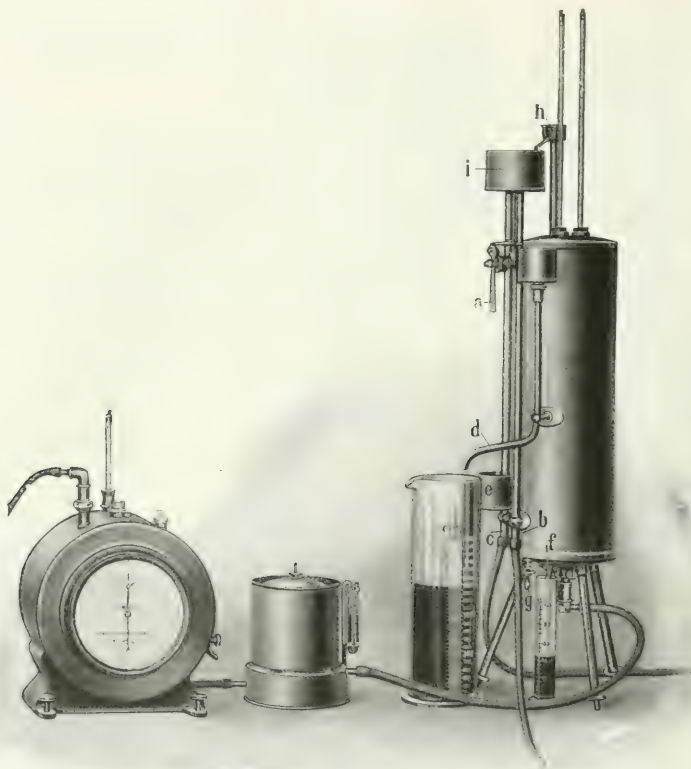


No. 23596

23592. **Calorimeter for Gas, Parr.** In this instrument have been eliminated the main sources of error, i.e., the metering of gas, the radiation of heat, the variations due to the differences in the humidity of the air, the uncertainty as to the quantity of air used, the incompleteness of combustion and the inaccuracy of the numerous thermometric readings which are necessary. Determination is based upon the burning of a standard gas of known composition and heat value on one side and the unknown gas on the other, in such a manner that equal volumes under equal pressures and equal temperatures may be made to impart their heat to equal volumes of water. The heat values are, therefore, in direct proportion to the temperature readings of the two thermometers and the metering of gas thus avoided. See *Journal of Industrial and Engineering Chemistry*, August, 1910. Complete, including generator for standard gas, electric motor for driving the apparatus, thermometers, reading lens, pilot lamps, gravity tank, one 2 lb. can of Hydron and instruction book..... 275.00

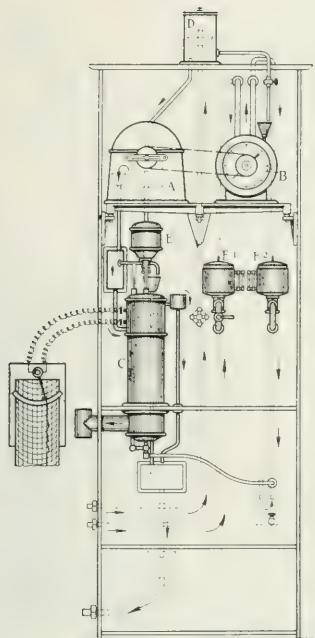
**CALORIMETER, SARGENT AUTOMATIC GAS**, for determining the calorific value and the dust, tar, moisture and solid matter in commercial and inflammable gases. The Calorimeter consists of a wet test meter in which the gas consumed is accurately measured. From this meter it flows to a governor which maintains a uniform pressure of the gas at the burner. In the calorimeter proper the accurately measured gas is burned and its calorific value is manifested in the rise of temperature of measured quantities of water flowing through. From the calorimeter proper the heated water for each unit of gas burned is automatically discharged into one of the pails in which it is weighed on the decimal scales. The pounds of water, times its rise in temperature in degrees Fahrenheit, times the quantity of gas in cubic feet consumed, gives the B. t. u. direct. The complete outfit consists of the following equipment, only one pair of thermometers, of course, being necessary.

23596. **Calorimeter Body** with automatic attachment, Bunsen burner, tubing, exhaust thermometer and beaker ..... 100.00  
 23600. **Two Thermometers**, inlet and outlet. Graduated to  $\frac{1}{10}^{\circ}$ . For ordinary work..... 16.00  
 23604. **Two Thermometers**, Precision, inlet and outlet, with certification. Graduated to  $\frac{1}{10}^{\circ}$ ..... 30.00  
 23608. **Wet Pressure Governor** with weights..... 15.00  
 23612. **Wet Test Gas Meter** with all attachments..... 52.50  
 23616. **Scales**, special, 10 lbs. weighing to  $\frac{1}{100}$  lb..... 12.00  
 23620. **Two Weighing Pails**, Balanced and nicked..... 5.00

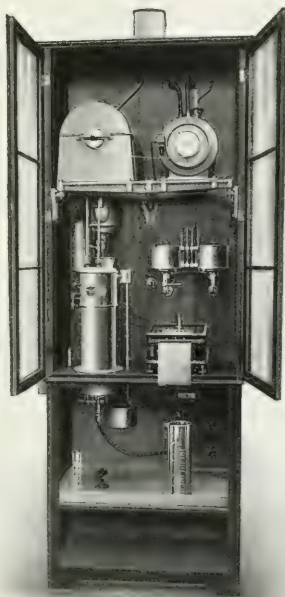


No. 23624 with No. 23628 and No. 23632

- CALORIMETER, JUNKERS GAS**, for continuous combustions, to determine quickly and exactly the heating value of gases and liquid fuels. For gas works, gas consumers, laboratories, manufacturers of gas motors, establishments using gas motors, etc. The heat developed from a constantly burning flame is entirely transmitted to an even flowing stream of water. This is the standard gas calorimeter throughout the civilized world. A galvanometer or millivoltmeter as regularly used with Thermocouple Pyrometers can, with slight alteration, be used in taking the readings on this instrument.
23624. **Calorimeter, Junkers Patent Gas**, including two thermometers 0-50° C. in  $\frac{1}{10}$ ths, reading lens, necessary rubber stoppers, tubing, graduated cylinders, etc., in polished case.
- |           |        |       |        |
|-----------|--------|-------|--------|
| Duty Free | 115.00 | Stock | 136.00 |
|-----------|--------|-------|--------|
23628. **Gas Meter**, 3 liters, for use with above for rich gases, with two thermometers 0-50° C. in single degree divisions, measuring cylinders and case.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 36.30 | Stock | 45.00 |
|-----------|-------|-------|-------|
23632. **Gas Pressure Regulator**, for above, with extra valve and case.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 14.85 | Stock | 18.00 |
|-----------|-------|-------|-------|
- Note**—The above three units constitute a complete outfit and are furnished at the sum of the prices, i.e., duty free at \$166.15 and from stock at \$199.00
23636. **Gas Meter**, for 10 liters, for pure gases, in case.
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 43.00 | Duty Paid | 52.00 |
|-----------|-------|-----------|-------|
23640. **Accessory Outfit for Liquid Fuels**, consisting of precision balance, burners, etc., in case.
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 36.30 | Duty Paid | 45.00 |
|-----------|-------|-----------|-------|
23644. **Thermometer** (as furnished with Junkers Calorimeter), 0-50° C. in  $\frac{1}{10}$ ths
- |        |   |   |   |   |   |                |      |
|--------|---|---|---|---|---|----------------|------|
| 23648. | " | " | " | " | " | 0-50° C. in 1° | 5.00 |
|        |   |   |   |   |   |                | 1.00 |



No. 23652



No. 23652

# EXPLANATION OF DIAGRAM

**WATER METER A, GAS METER B,** which by means of a light running coupling (usually cogwheels with chain) are compelled to keep the relation between the quantity of gas and the quantity of water constant.

**CALORIMETER BODY C,** the arrangement for continuously recording the heating value which takes up the gas flame and gives off the heat developed therefrom to the stream of water continuously flowing through it.

**REGULATOR D,** which allows the water to flow to the plummet box.

**E,** which provides for a regular flow of water to the water meter.

**TWO GAS PRESSURE REGULATORS F1 AND F2** which keep the pressure in front and behind the gas meter regular within certain limits.

**DIFFERENTIAL THERMOMETER,** with connections, a thermo-element for the production of an electric current, the tension of which denotes the difference of temperature between the incoming and outflowing water.

**TWO CONTROL THERMOMETERS** for the incoming and outflowing water.

**CASE** with tightly fastened connection pipes, etc.

**CALORIMETER, JUNKERS AUTOMATIC GAS,** for the continuous measurement and recording of the heat value of gases. For gas plants, coke ovens, blast furnaces, foundries and all other establishments producing gas for light, power and heat as well as for laboratory investigations. The instrument requires no measurement of water or gas, no watching of thermometers and no calculations, the calorific value being continuously shown by a pointer. Readings can be made at points distant from the calorimeter or at several points simultaneously from one calorimeter.

23652. Calorimeter, Junkers Automatic Gas, complete as above described, including calorimeter with thermo-electric pile, apparatus for measuring the proportions of gas and water with supply regulator, regulator for gas pressure, cupboard with glass doors and accessories and reservoir for supplying water constantly to the apparatus for measuring water, but without galvanometer.

Duty Free.....	313.50	Stock.....	380.00
----------------	--------	------------	--------

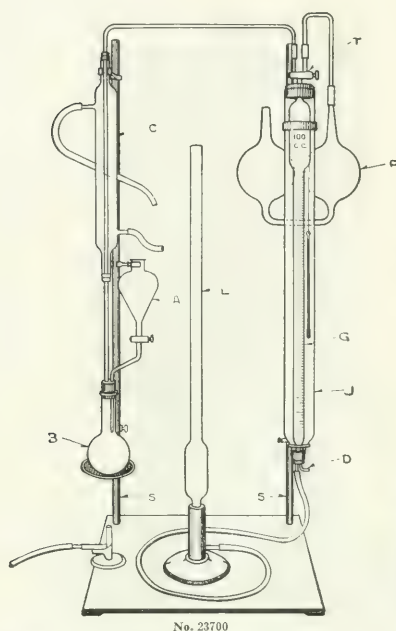
23656. Galvanometer, Indicating simple construction, for use with above.		Duty Paid.....	60.00
Duty Free.....	49.50		

23660. Galvanometer, Indicating improved construction.		Duty Paid.....	80.00
Duty Free.....	66.00		

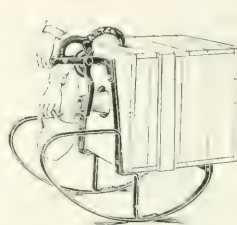
23664. Galvanometer Registering, with 24-hour charts.		Duty Paid.....	180.00
Duty Free.....	148.50		

23668. Galvanometer, Registering, for continuous operation.		Duty Paid.....	260.00
Duty Free.....	214.50		





No. 23700



No. 23704



No. 23708



No. 23712



No. 23716



No. 23724



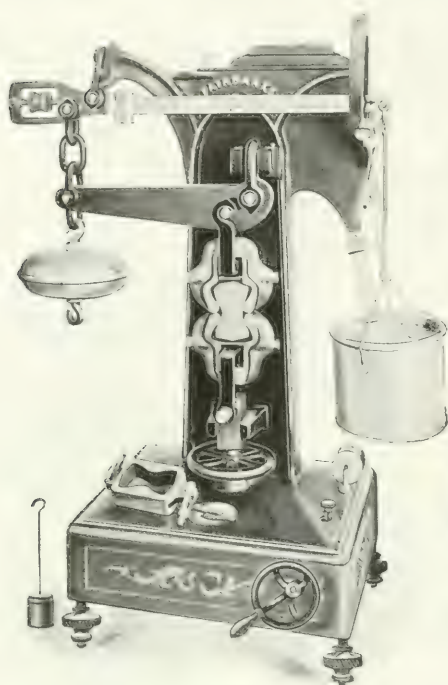
No. 23728



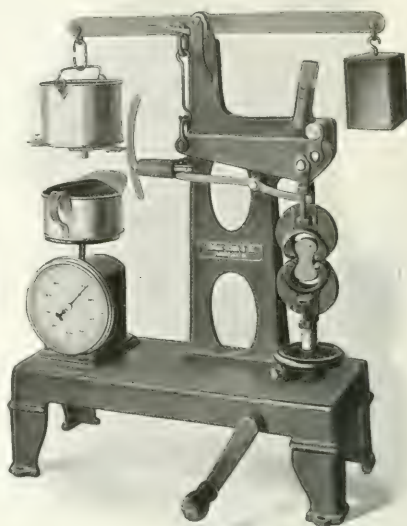
No. 23736

23700. Carbon Apparatus, Parr, for the determination of total carbon in coal, coke, etc., in connection with the Parr Calorimeter. Complete with directions and tables. 45.00
23704. Carboy Inclinator, Universal, strongly built, of iron throughout. Is shipped knocked down and may be assembled in a few minutes. Delivers the last drop from a carboy. 5.00
23708. Carboy Stopper, Hard Rubber, with air inlet and soft rubber cap to fit over the mouth of the carboy; for the convenient handling of acids. 4.00
23712. Casseroles, Sanitäts Porcelain, trade mark "arrow," with porcelain handle, without lids.  
Capacity, cc. 30 70 100 125 250 375 625 1000 2000  
Diameter, mm. 50 65 75 85 100 110 130 160 230  
Each. .18 .20 .30 .30 .35 .55 .70 1.00 2.75
23716. Casseroles, Sanitäts Porcelain, trade-mark "arrow," with wooden handles but without lids.  
Capacity, cc. 125 250 375 625 1000 2000  
Diameter, mm. 90 110 130 140 160 200  
Each. .40 .55 .70 .85 1.15 2.10
23720. Lids only for Casseroles No. 23716.  
To fit size, cc. 125 250 375 625 1000 2000  
Each. .10 .15 .20 .25 .30 .50
23724. Casseroles, Royal Berlin Porcelain, trade mark "scepter." With porcelain handle, without lids.  
Capacity, cc. 30 75 150 210 375 750 1250 2000  
Diameter, mm. 50 70 85 95 110 135 165 175  
Each. .40 .50 .60 .75 .90 1.65 2.10 3.60
23728. Casseroles, Royal Berlin Porcelain, trade mark "scepter." Deep form, with wooden handle.  
Capacity, cc. 1050 1900 3230  
Diameter, mm. 110 140 170  
Height, mm. 155 180 205  
Each. 2.00 2.90 4.40
23732. Casseroles, Opaque Fused Silica, shape of 23724; glazed inside and outside, with handle.  
Capacity, cc. 30 75 150 200 350  
Each. 1.75 2.15 2.65 3.40 4.40
23736. Cement, Refractory (Vulcan Paste) Northrup. For use at the highest available temperatures. Applied as a paste for stopping up cracks, sealing holes, as a protective covering to heating wires wound on cylinders or, when thinned according to directions on jar, as a protecting paint. It is very plastic and cohesive as a paste or paint, which on heating to 200° C or more, becomes flinty hard. It is very useful in many ways for high temperature experiments in the laboratory. Per pint jar. 3.25





No. 23788



No. 23792

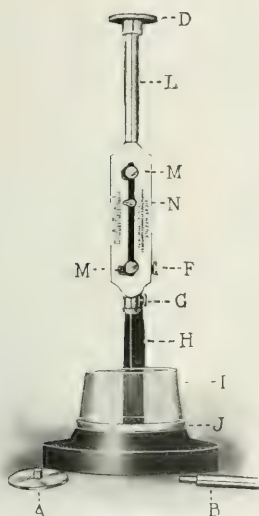


No. 23796

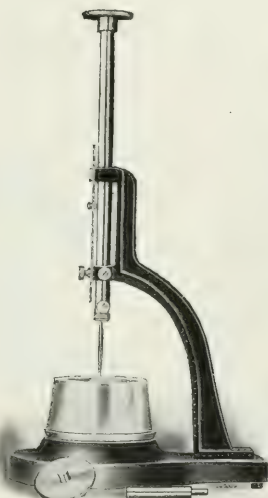


No. 23800

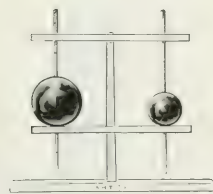
23784. **Cement Testing Machine, Fairbanks Automatic**, recognized as standard. Without springs or hydraulic apparatus, the action being automatic and entirely free from jars which tend to break the specimen before its greatest efficiency has been reached. The tensile strength is generally accepted as the standard, it being less difficult to obtain fair comparisons than by other methods. 1000 lbs. capacity. Size 12 x 24 inches. .... 110.00
23788. **Cement Testing Machine, Fairbank's Improved Automatic**. This machine is exactly like the above except that it is mounted on a sub-base containing a worm and worm gear connected to an axis which is threaded and passes up through the base, and hand wheel by which means a steady tension is applied to the briquette until broken. Recommended because of great increase in tensile strength of cement during recent years. Capacity 1000 lbs. .... 160.00
23792. **Cement Testing Machine, Olsen's New Automatic Shot form**. The principal advantages of this machine are as follows:  
 The machine is automatic to its full capacity and is not touched from start to finish of test.  
 The instant the briquette breaks, the breaking load is read on the dial of the scale.  
 The load is applied with absolute smoothness, and impact from falling shot is eliminated.  
 The cut-off on the shot kettle is practically instantaneous.  
 All shot that has escaped from the kettle has already done its work and the column of falling shot in the air when the specimen breaks is, therefore weighed as it should be.  
 A new grip which brings the strain uniformly on the specimen is used.  
 The briquette hangs clear of the frame of the machine, giving plenty of room for the hands when adjusting specimens.  
 This is a widely used and thoroughly satisfactory outfit; 1000 lbs. capacity, length 24 inches, height 26½ inches, weight 40 lbs. .... 125.00
23796. **Soundness Test Apparatus, Le Chatelier**. A very convenient method. .... 3.00
23800. **Cement Sampler**, for obtaining fine samples of cement from the center of a barrel. .... 7.50



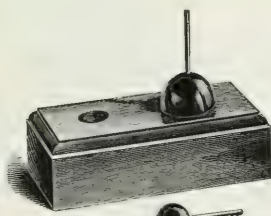
No. 23804



No. 23804—Side View

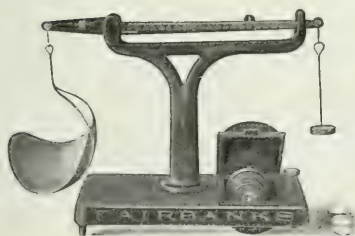


No. 23821

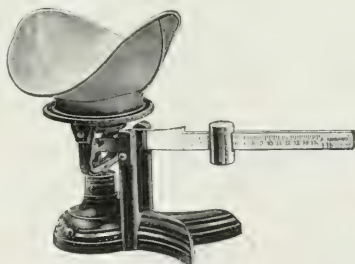


No. 23820

23804. **Vicat Needle Apparatus, Improved form.** This apparatus does not require an extra compensating weight to give a downward pressure of 300 grams when the 1 mm needle is used (both needles are made of equal weight), thus obviating error because of overlooking the use of the compensating weight with the small needle. Complete with one mould..... 16.00
23808. **Extra Rubber Mould**..... 2.50
23812. **Extra Glass Mould**..... 1.00
23816. **Vicat Needle Apparatus, Bramwell Improved Form,** very convenient to determine the normal consistency and time of setting of cement. The plunger ends are of different diameters and the small needle when not in use can be reversed and screwed into the body of the main plunger..... 20.00
23820. **Gilmore Needle,** for determining both the initial and final set of cement. Consists of a steel needle  $\frac{1}{16}$  inch in diameter with a  $\frac{1}{2}$  lb. weight, and a needle  $\frac{1}{32}$  inch in diameter with a 1 lb. weight.. 4.00
23824. **Gilmore Needle,** same as No. 23820 but with vertical support to keep needle perpendicular to the surface of the pat..... 5.00



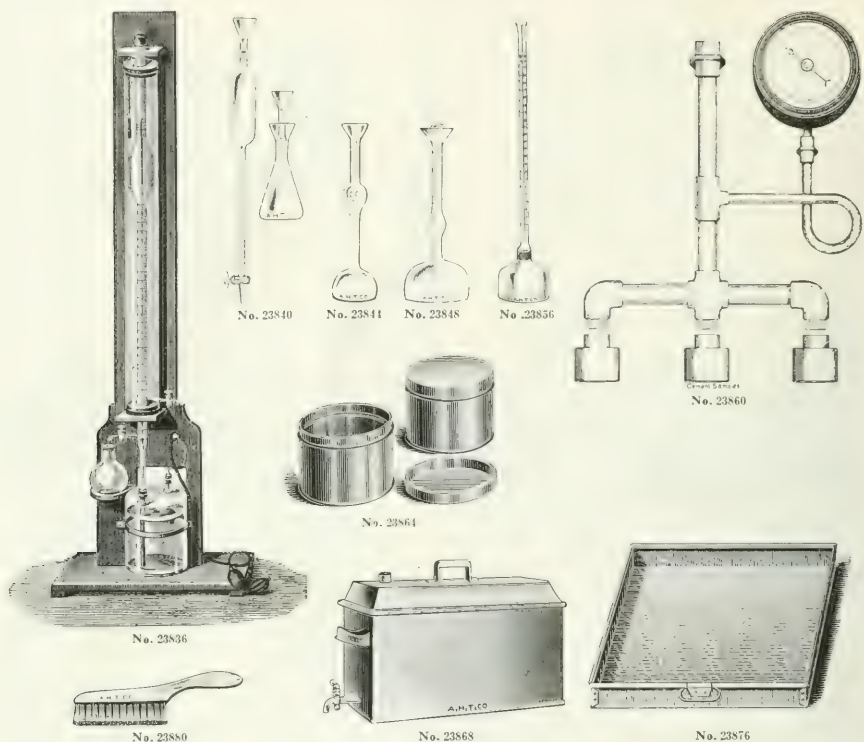
No. 23828



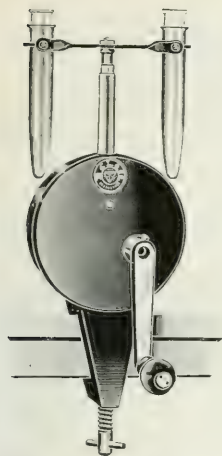
No. 23832

23828. **Cement Scale,** specially made to show the fineness of cement. Will weigh 1 lb. to .0001 lb. avoirdupois..... 13.00
23832. **Percentage Scale for fineness test,** with beam divided to 16 oz. in  $\frac{1}{2}$  oz.; also with a second row of figures reading from 0 to 100%..... 6.00

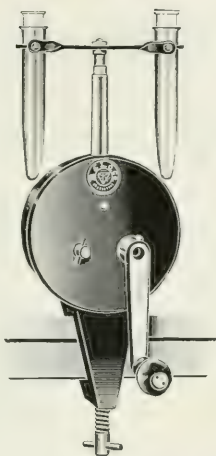




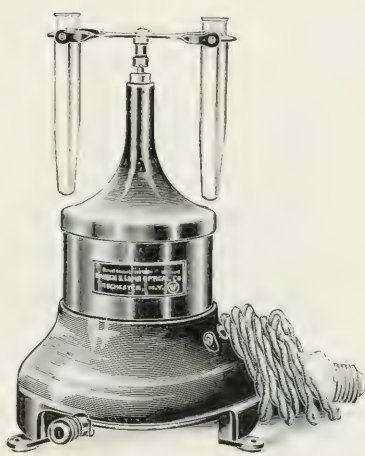
23836.	Volumenometer, Erdmenger-Mann, for the determination of the specific gravity of cement. A very accurate method, consuming much less time than the Le Chatelier, and highly recommended by leading cement engineers, complete with ten flasks.	35.00
23840.	Specific Gravity Apparatus, Jackson, for the true determination of the specific gravity of cement. Consists of a special burette with bulb and stopcock and a special flask with ground in funnel stopper of exactly the same bore as the burette. As described in the <i>Journal of the Society of Chemical Industry</i> , 15 June, 1904, No. 11, Vol. XXIII.	6.00
23844.	Specific Gravity Bottle, Le Chatelier, as used in cement testing	2.00
23848.	Specific Gravity Bottle, Le Chatelier, New Form, in accordance with the U. S. Bureau of Standards requirements and as used in the U. S. Government test for Portland Cement. See Circular No. 33 of the U. S. Bureau of Standards, without certificate.	3.00
23852.	Specific Gravity Bottle, as above, but with certificate of the U. S. Bureau of Standards.	5.00
23856.	Specific Gravity Bottle, Schuman, with tube graduated to 50 cc in $\frac{1}{16}$ ths.	2.50
23860.	Permeability Testing Apparatus, for determining experimentally the exact relations between the permeability and strength of concrete, treated by the integral method. The briquettes are cylindrical in shape, 3 inches in diameter and 2 inches high. A pressure gauge is attached to the main vertical tube for indicating the pressure under which the water flows. As constructed in the Structural Material Testing Laboratory of the Brooklyn Polytechnic Institute. Complete with one mould.	14.00
23862.	Extra mould.	4.00
23864.	Cement Sample Cans, per dozen.	1.00
23868.	Steaming Apparatus, for boiling and steaming test. Made of copper; 12 x 12 x 24 inches.	30.00
23872.	Glass Plate, for use with briquette moulds, 24 x 24 inches.	8.00
23876.	Pan of galvanized iron, 24 x 24 x 3 inches deep.	2.00
23880.	Brush of brass wire with wooden handle.	.50
23884.	Trowels, for making briquettes, etc.	
	Size.....	Small Large
	Each.....	.40 .60



No. 23900



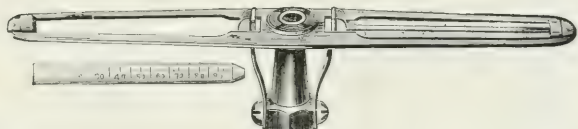
No. 23904



No. 23908



No. 23924

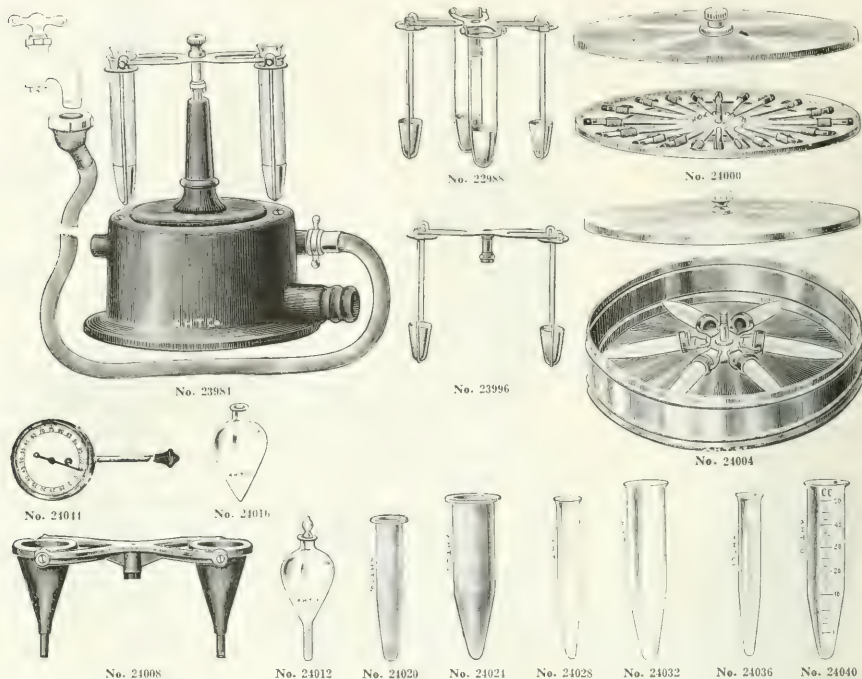


No. 23932

23900. Centrifuge, Bausch & Lomb, Hand, single speed, giving 1,200 revolutions per minute with fifty turns of the handle, the latter being so constructed as to render sudden stopping impossible. Complete with two-arm sedimentation attachment and one graduated and one ungraduated glass tube 7.50
23904. Centrifuge, Bausch & Lomb, Hand, two speed, providing for speeds from 1200 to 4000 revolutions per minute. Similar in construction to No. 23900. Complete with Daland's haematokrit, automatic blood pipette, two sputum tubes and two-arm sedimentation attachment with one graduated and one ungraduated glass tube. 10.00
23908. Centrifuge, Bausch & Lomb, Electric, with rheostat providing five different speeds of from 750 to 2100 revolutions per minute with two 15 cc tubes. For operation upon ordinary incandescent lamp socket. Please specify voltage in ordering. Complete with two-arm sedimentation attachment and one graduated and one ungraduated glass tube.
- For Circuit . . . . . 110 volts, direct . . . . . 220 volts, direct . . . . . 110 volts, alternating, 60 cycles
- Each . . . . . 25.00 . . . . . 27.50 . . . . . 30.00

#### Accessories for use with any of above Centrifuges.

23912. High Speed Indicator. . . . . 1.50
23916. Speed Indicator, automatic registering. . . . . 3.00
23920. Two-arm Head, for 50 cc tubes, with aluminum shields and one graduated and one ungraduated tube. 50 cc. . . . . 4.50
23924. Four-arm Head, for 15 cc tubes, with aluminum shields and one graduated and three ungraduated tubes. 15 cc. . . . . 4.50
23928. Blood Lancel, Moore automatic. . . . . 1.50
23932. Haematokrit, Daland, with two percentage and two sputum tubes. . . . . 2.50
23936. Milk Tube, for determining percentage of fats. . . . . .50
23940. Blood Tube, for use in Haematokrit for determining percentage of haemoglobin. . . . . .50
23944. Pipette, 1 cc, for filling milk tubes. . . . . .10
23948. " automatic, for filling blood tubes. . . . . .75
23952. Glass Centrifuge Tube, graduated, 15 cc. . . . . .35
23956. " " " 50 cc. . . . . .75
23960. " " " ungraduated, 15 cc. . . . . .15
23964. " " " 50 cc. . . . . .30
23968. Aluminum Shield, to hold 15 cc glass tube. . . . . .25
23972. " " " 50 cc " " . . . . . .50
23976. Sputum Tube, for haematokrit, ungraduated. . . . . .25
23980. Metallic Guard, for use with Electric Centrifuge No. 23908. . . . . 7.50

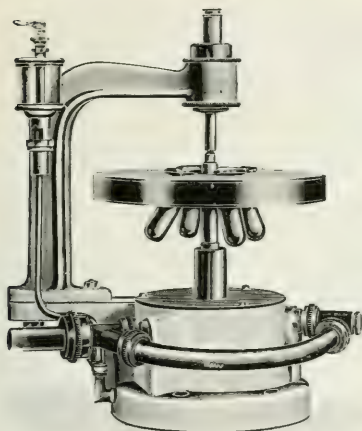


23984. **Centrifuge, Water Motor, Arthur H. Thomas Co. Special**, with protected bearing which cannot become rusted and from which the oil cannot become washed out by the water. For attachment to any ordinary faucet by means of patent hose connections. The speed is under absolute control by merely turning on or off the flow of water. Runs absolutely noiselessly and may be left going constantly without attention. Each machine is furnished with necessary aluminum shields, 4 ft. of pressure tubing and patent hose connection for faucet. With patent hangers which support the aluminum shields at the lower part of the machine. Includes obviating of the use of lip of both aluminum and glass tubes when tubes are hung by the lip. With 2-15 cc tube holder and one each plain and graduated glass tubes, 15 cc. . . . . 8.00

**Note.**—It is assumed in listing the accessories for our Water Centrifuge that the 2-15 cc tube head with aluminum and glass tubes will be desired and it is, therefore, necessary in order to secure the price of any special outfit simply to add the price for the various heads. If the 2-15 cc tube head included in the regular outfit is not desired a credit of \$1.00 is allowed when special outfits are made up.

### Accessories for Water Centrifuge.

23988.	Four-arm Head, with patent hangers, for 15 cc tubes, without shields or glass tubes	2.75
23992.	“ “ “ “ “ 50 “ “ “ “ “ “ “ “	3.75
23996.	Two-arm “ “ “ “ “ 50 “ “ “ “ “ “ “ “	2.75
24000.	Lactokrit, Stewart, for estimating the number of pus cells and the character of bacteria and insoluble matter contained in milk. Complete with 20 glass tubes and stoppers	7.50
24002.	Extra Glass Tubes with rubber stoppers and nipples, for use with above. Per dozen	1.50
24004.	Rotating Metal Guard, for water centrifuge, 14 inches in diameter by 3 inches deep. The whole hood rotates permitting much greater speed than the ordinary head and eliminating the danger of tubes flying off during operation.	
	With shields for tubes	4-15 cc 6-15 cc 8-15 cc
	Each	9.00 10.00 11.00
24008.	Two-arm Head, Goetz, for phosphor determination in steel analysis, without tubes	7.50
24012.	Goetz Phosphorous Tube, glass, graduated and with glass stopper	1.00
24016.	“ “ “ “ ungraduated and without glass stopper	.40
24020.	Aluminum Shields for 15 cc glass tubes	.25
24024.	“ “ “ 50 cc “	.50
24028.	Glass Centrifuge Tube, ungraduated, 15 cc	.15
24032.	“ “ “ “ 50 cc	.30
24036.	“ “ “ graduated, 15 cc	.35
24040.	“ “ “ “ 50 cc	.75
24044.	Speed Indicator, for Water Centrifuge	3.00



No. 24018



No. 24056

Table of Speeds with Arthur H. Thomas Company Special Water Motor Centrifuge, No. 23984.

Head	13 lbs. pressure	20 lbs. pressure	30 lbs. pressure	40 lbs. pressure	50 lbs. pressure	60 lbs. pressure
2-15 cc tubes.....	1100 r. p. m.	1200 r. p. m.	1500 r. p. m.	1700 r. p. m.	1900 r. p. m.	2100 r. p. m.
4-15 cc tubes.....	850 "	970 "	1200 "	1400 "	1550 "	1700 "
2-50 cc tubes.....	900 "	1050 "	1300 "	1500 "	1700 "	1900 "
4-50 cc tubes.....	750 "	850 "	1050 "	1280 "	1400 "	1600 "

24048. Centrifuge, Water, Double Jet, Martin, for high speeds. This form of centrifuge consists of a plate with four radiating chambers each having a depth sufficient to take a tube and its necessary holder flush with the under surface of the plate, thus avoiding all atmospheric resistance. The plate is fitted to a spindle, pivoted between an upper and lower center, and the spindle carries at its lower end a small water wheel in a "well" to which are attached the nozzle or nozzles and fittings for connecting with the water main and for carrying off the waste water. The upper center is poised lightly to avoid friction, and is mounted in a flexible holder, thus giving the necessary freedom from strain when working at high speeds. Three sizes of plates are made, carrying tubes of 25 cc, 10 cc and 5 cc, respectively. The speed has been carefully measured and a rotation of from 1000 to 5000 revolutions per minute can be maintained with ordinary pressure and with absolute safety. Complete with four German silver tube holders and 1 dozen glass tubes.

For four tubes of.....	5 cc	10 cc	25 cc
Duty Free.....	34.50	34.80	44.10
Duty Paid.....	41.40	41.80	52.90
24052. Extra Glass Tubes for use with Martin Centrifuge. Capacity, cc.....	5	10	25
Per dozen, from stock.....	.90	1.10	1.35

Table of Speeds with Martin Double Jet Centrifuge

Head	Pressure in lbs.	10	15	20	25	30	35	40	45	50	60	70
4- 5 cc tubes.....	1200	1600	2000	2500	3100	3400	3700	4000	4300	4550	4900	
4-10 cc ".....	1000	1400	2200	2700	3100	3400	3700	3900	4100	4500	4900	
4-25 cc ".....		900	1200	1550	1900	2100	2300	2500	2900	3200	3500	

24056. Centrifuge Electric, specially arranged for Goetz method of phosphorous determination in steel analysis. With aluminum arm with conical aluminum Goetz tube holders and graduated, glass stoppered Goetz tubes. Size..... 2-tube 4-tube

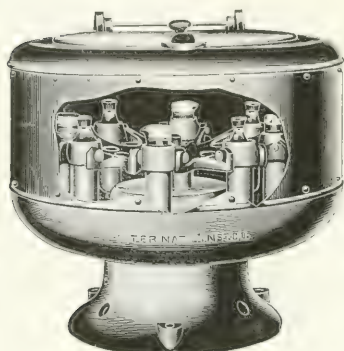
With rheostat for 110 volts direct current..... 44.00 55.00

24060. Centrifuge, Electric, as above, but with rheostat for 220 volts direct current..... 54.00 65.00

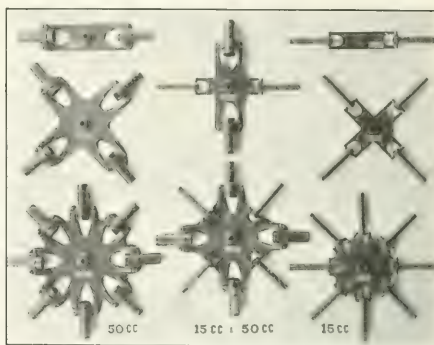
24012. Goetz Phosphorous Tubes of glass, graduated and with glass stopper, each..... 1.00

24016. " " " " ungraduated and without glass stopper, each..... .40





No. 21064



50 cc and 15 cc Heads and Tubes for Size 1 Centrifuge

**CENTRIFUGES, INTERNATIONAL ELECTRIC SIZE 1**, a compact, high-power centrifuge, with moderately large capacity, conveniently arranged for research and routine work in bacteriological, physiological and chemical laboratories of hospitals, medical schools, dairies and health departments. Made in two types according to speed. Type A and Type B. Height 18 inches, diameter 17 inches and weight about 75 lbs. With speed control rheostat and protecting case. Speeds with various heads are shown in table.

Speeds with head	4-tube, 15 cc	8-tube, 50 cc	Board of Health
Size 1, Type A, direct current.....	3000 r.p.m.	2400 r.p.m.	3000 r.p.m.
“ “ “ alternating current.....	1900 “	1600 “	2800 “
“ “ Type B, direct current.....	4000 “	3000 “	3000 “
“ “ “ alternating current.....	3600 “	3000 “	3000 “

24064. Centrifuge, International Size 1, with speed control rheostat and protecting case, but without heads or tubes.

For current.....	110 volts, d. c.	220 volts, d. c.	110 volts, a. c. 60 cycles	220 volts, a. c. 60 cycles
Size 1, Type A.....	40.00	44.00	46.00	48.00
“     Type B.....	65.00	68.00	78.00	80.00

### Accessories for Size 1 Centrifuge.

The price of any desired outfit may be had by adding the price of attachments desired to the price of the machine as listed above. No glassware is included in price for attachments. These must be added separately.

<b>24072.</b>	<b>Head</b> , 2-tube, to carry either 2-50 cc tubes, two Gooch crucibles or two Babcock bottles without cups or tubes.....	3.00
<b>24076.</b>	<b>Trunnion cups</b> for Gooch crucibles, each.....	.75
<b>24080.</b>	<b>Hard Rubber Collars</b> for Gooch crucibles. (Crucibles should be sent to us to be fitted.) Each....	.90
<b>24084.</b>	<b>Trunnion Ring</b> and 50 cc metal tube .....	1.25
<b>24092.</b>	<b>Head</b> , 2-tube, to carry 2-15 cc tubes, with metal tubes .....	3.40
<b>24096.</b>	" " " 4-tube, " 4-15 cc " " "	7.50
<b>24100.</b>	" " " 8-tube, " 8-15 cc " " "	13.60
<b>24104.</b>	<b>Combination Head</b> , 4-tube, to carry 2-15 cc and 2-50 cc tubes, with metal tubes .....	8.70
<b>24108.</b>	<b>Head</b> , 1-tube, to carry 1-50 cc tubes, with metal tubes.....	9.60
<b>24112.</b>	" " S-tube, " 8-50 cc " " "	17.20
<b>24116.</b>	<b>Combination Head</b> , 8-tube, to carry 4-15 cc and 4-50 cc tubes, with metal tubes .....	16.40
<b>24120.</b>	<b>Trunnion Cups</b> , for Babcock test bottles (used in 50 cc places), each .....	.50
<b>24124.</b>	<b>Board of Health Head</b> , without tubes.....	10.00
<b>24128.</b>	<b>Head</b> , perforated brass basket, 5 inches in diameter, with drip pan.....	20.00
<b>24136.</b>	<b>Trunnion Carriers</b> for Goetz tubes, each.....	1.75
<b>24140.</b>	" " Cups for 200 cc bottles, each .....	3.00
<b>24144.</b>	" " Carriers for 150 cc Squibb funnels, each.....	1.75
<b>24148.</b>	<b>Prescription Bottles</b> , of glass, 200 cc, per dozen.....	1.50
<b>24152.</b>	<b>Glass Centrifuge tubes</b> , plain, 15 cc capacity, per dozen.....	1.35
<b>24156.</b>	" " " 50 cc " per dozen.....	1.50
<b>24160.</b>	" " " graduated, 15 cc capacity, per dozen.....	4.00
<b>24164.</b>	<b>Board of Health Tubes</b> , 2 cc capacity, per 100.....	4.75
<b>24168.</b>	<b>Head</b> , 2-place, for two Goetz Phosphorous Tubes, 2-150 cc Squibb's funnels or 2-200 cc bottles, without trunnion carriers.....	5.00
<b>24012.</b>	<b>Goetz Phosphorous Tubes</b> , of glass, graduated and with glass stopper, each.....	1.00
<b>24016.</b>	" " " " ungraduated and without stopper, each.....	.40

# 24172. Centrifuge, International, with Hospital Equipment, for urine analysis, bacteriology, serology, etc., consisting of the following:

1 No. 24104 Combination Head carrying 2-15 cc and 2-50 cc tubes, with steel tubes.  
1 doz. No. 24152 glass tubes plain, 15 cc. capacity.

6 No. 24160 glass tubes, graduated, 15 cc capacity.  
1 doz. No. 24156 glass tubes, 50 cc. capacity.

Current.....	110 volts, d. c.	220 volts, d. c.	110 volts, a. c., 60 cycles	220 volts a. c., 60 cycles
Size 1, Type A.....	53.50	57.50	59.50	61.50
“ 1, Type B.....	78.50	81.50	91.50	93.50

# 24176. Centrifuge, International, with Board of Health Equipment, for urine analysis, bacteriology, serology, and milk testing, consisting of the following

No. 24116 Combination Head carrying 4-15 cc and 4 50 cc tubes, with metal tubes.

No. 24124 Board of Health Head.

4 No. 24120 Trunnion Cups for Babcock bottles.

1 doz. No. 24152 glass tubes, 15 cc, plain.

1 doz. No. 24160 glass tubes, 15 cc, graduated.

1 doz. No. 24156 “ “ 50 cc capacity.

2 doz. No. 24164 Board of Health Tubes with rubber stoppers.

1 doz. No. Babcock milk bottles.

Current.....	110 volts, d. c.	220 volts, d. c.	110 volts, a. c. 60 cycles	220 volts, a. c. 60 cycles
Size 1, Type A.....	78.35	82.35	84.35	83.35
“ Type B.....	103.35	106.35	116. 5	115.35

# 24180. Centrifuge, International, with Board of Health and Food Laboratory Equipment, a very complete outfit for urine analysis, bacteriology, serology, milk testing, food analysis and most work encountered in hospital or public service laboratories, consisting of the following:

No. 24100 Head carrying 8-15 cc tubes, with metal tubes.

No. 24112 “ “ 8-50 cc “ “

8 Trunnion cups for Babcock Test Bottles.

No. 24124 Board of Health Head.

No. 24168 Head carrying 2 Squibb's separatory funnels.

2 No. 24141 Trunnion Carriers for Squibb's separatory funnels.

1 doz. No. 24152 glass tubes, 15 cc, plain.

1 doz. No. 24160 “ “ graduated

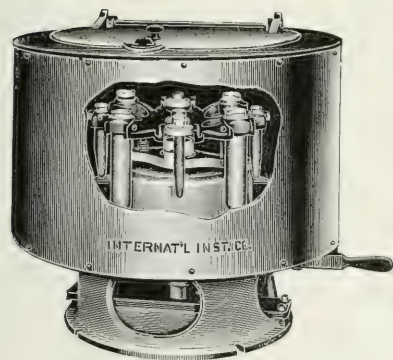
1 doz. No. 24156 “ “ 50 cc capacity.

2 doz. No. 24164 Board of Health tubes with rubber stoppers.

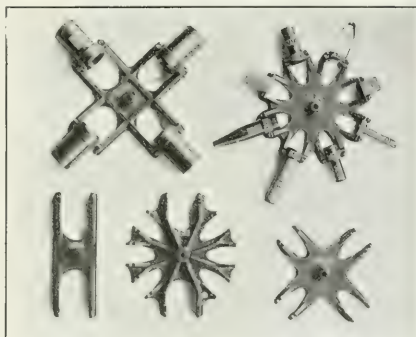
2 doz. No. Babcock Milk Test Bottles

2 No. Squibb's Separatory Funnels, 150 cc.

Current.....	110 volts, d. c.	220 volts, d. c.	100 volts, a. c. 60 cycles	220 volts, a. c. 60 cycles
Size 1, Type A.....	108.50	112.50	114.50	116.50
“ Type B.....	133.50	136.50	146.50	148.50



No. 24181



Four-tube, eight-tube heads, etc., for Size II Centrifuge

**CENTRIFUGE INTERNATIONAL ELECTRIC, SIZE 2,** designed for larger capacity but not for higher speeds than Size 1 machines. Made in two types according to speed, types A and B. Height 23 inches, diameter 24 inches, weight about 150 lbs. Size 2, Type A, is not made for alternating current. Speeds with various heads are shown in table.

Speeds with head	16-tube, 50 cc or 8-tube, 100 cc	8-tube, 50 cc	Board of Health
Size 2, Type A, direct current.....	1500 r.p.m.	2000 r.p.m.	3000 r.p.m.
“ Type B, “ “.....	2200 “	3000 “	3000 “
“ Type B alternating current.....	2200 “	3000 “	3000 “

# 24184. Centrifuge, International Size 2, with speed control rheostat and protecting case, but without heads or tubes.

Current.....	110 volts, d. c.	220 volts, d. c.	110 volts, a. c. 60 cycles	220 volts, a. c. 60 cycles
Size 2, Type A.....	61.00	65.00		
“ Type B.....	95.00	99.00	95.00	95.00

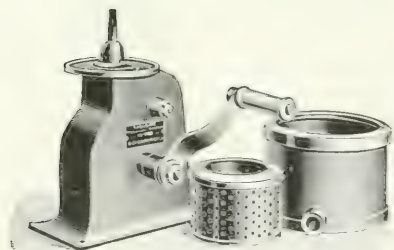
## Accessories for Size 2 International Centrifuge.

Accessories listed under the Size 1 Centrifuge, p. 118, may also be used with the Size 2 machine when desired and, in addition, the Attachments of larger capacity, and for special purposes as listed below. No glassware is included in price for attachments.

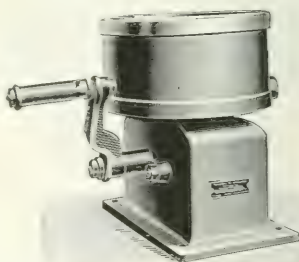
24188.	Head, 8-tube, carrying 100 cc, 50 cc or 15 cc tubes or Babcock bottles, without tubes.....	10.00
24192.	Combination Head, 8-place, carrying 2-200 cc tubes, or 2-150 cc tubes, or 2 Squibb's funnels or 2 Goetz tubes, and 6-100 cc tubes, or 6-50 cc tubes or 6-15 cc tubes or 6 Babcock bottles, without cups or tubes.....	13.50
24196.	Head, 4-place, carrying either 4-200 cc cups or 4-150 cc Squibb's funnels, without cups.....	8.00
24200.	" 16-tube, carrying 16-50 cc tubes, or 16 Babcock bottles, without cups or tubes.....	16.00
24204.	Metal Tubes, 100 cc, each.....	.75
24208.	Trunnion Rings, 100 cc, each.....	.35
24212.	Metal Tubes, 50 cc, each.....	.55
24216.	Trunnion Rings, 50 cc, each.....	.35
24220.	Metal Tubes, 15 cc, each.....	.45
24224.	Trunnion Rings, 15 cc, each.....	.40
24228.	Glass tubes, with lip, 100 cc capacity, per dozen.....	1.75
24232.	Centrifuge, International, with Soil Analysis Equipment, consisting of Size 2, Type B Centrifuge, with a speed of 1100 revolutions per minute, and equipped with a speed control rheostat, 8-tube head, eight 100 cc metal tubes and rubber cushions, $\frac{1}{2}$ gross 100 cc glass tubes and an eight tube rack for the bench.	
	Current.....	110 volts, d. c. 220 volts, d. c. 110 volts, a. c. 60 cycles 220 volts, a. c. 60 cycles
	Each.....	80.00 84.00 101.00 104.00
24236.	Centrifuge, International, with General Laboratory Outfit with special reference to bacteriological and soil work, and with other large quantities to be handled, consisting of Size 2 Centrifuge with speed control rheostat, 8-tube head, eight each of 100, 50 and 15 cc metal tubes and two dozen each of 100 cc, 50 cc and 15 cc plain glass tubes.	
	Current.....	110 volts, d. c. 220 volts, d. c. 110 volts, a. c. 60 cycles 220 volts, a. c. 60 cycles
	Size 2, Type A.....	102.00 106.00
	" Type B.....	136.00 140.00
		136.00 136.00

Note—For Size 2 Centrifuge fitted with 16- and 24-bottle Babcock heads, see Milk Analysis Apparatus, p. 347.

24240.	Centrifuge, International, with Food Analysis Equipment, consisting of No. 24192 Combination Head, 8-place, for 2 Squibb's funnels and 6-50 cc tubes, 2 Squibb's separatory funnels, 150 cc, 1 dozen glass tubes 50 cc, $\frac{1}{2}$ dozen metal tubes 50 cc, $\frac{1}{2}$ dozen Trunnion Rings for 50 cc tubes, and two carriers for Squibb's separatory funnels.	
	Current.....	110 volts, d. c. 220 volts, d. c. 110 volts, a. c. 60 cycles 220 volts, a. c. 60 cycles
	Size 2, Type A.....	88.90 92.90
	" Type B.....	122.90 126.90
		122.90 122.90



No. 24241

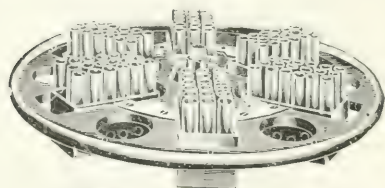


No. 24252

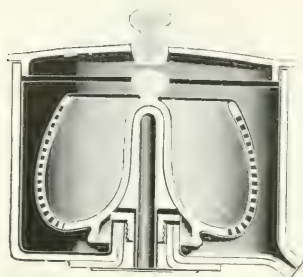
24244.	Centrifuge Cyclone, with perforated drum, for separating precipitates and crystals from their mother liquors. Widely used by sugar chemists for the determination of the yield as well as purity test. With bronze basket, $4\frac{1}{2}$ inches in diameter, with crank for hand power driving....	50.00
24248.	Centrifuge, Cyclone, same as above but with pulley for power driving.....	50.00
24250.	Hard Rubber Basket for handling of material which must not come in contact with the metal.....	8.00
24252.	Centrifuge, Cyclone, same as above but heavier and larger, with metal basket 8 inches in diameter with crank for hand power driving.....	100.00
24256.	Centrifuge, Cyclone, same as above but with pulley for power driving.....	100.00
24258.	Hard Rubber Basket for above.....	10.00







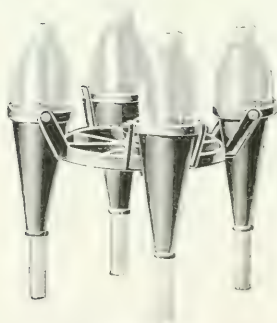
No. 24312 Special Head for Serum Work



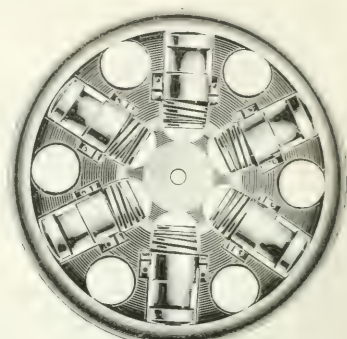
No. 24268 Head A



No. 24268 Head C



No. 24268 Head G and H



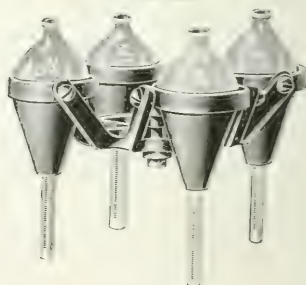
No. 24260. Regular Head



No. 242628 Head B



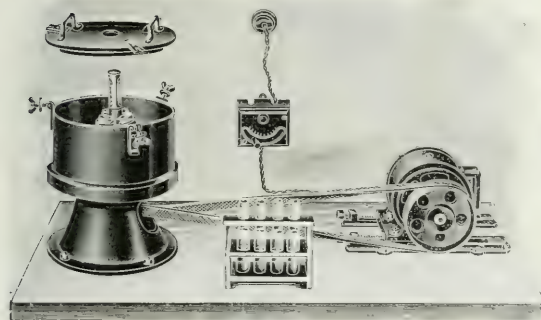
No. 24268 Head D



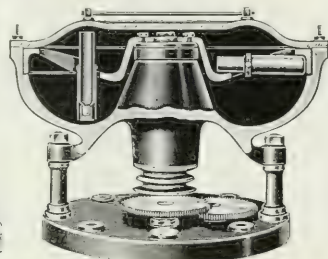
No. 24268 Head E and F

# Accessories for the Large Universal Centrifuge as above.

24272.	Porcelain Perforated Drum for Head A, 175 x 140 mm .....	18.00	
24276.	" outside jacket for Head A, 240 x 210 mm .....	24.00	
24280.	Glass Cylinders for Head C, 50 cc capacity .....	.60	
24284.	Metal Cups, each with two circular sieves and one felt plate, for Head D, each .....	1.25	
24288.	Felt Discs, per 100 .....	2.50	
24292.	Graduated Glass Tubes, for Head E, 50 cc capacity, each .....	1.15	
24296.	" " " " " F, 100 cc " each .....	1.30	
24300.	" " " " " G, 50 cc " each .....	1.15	
24304.	" " " " " H, 100 cc " each .....	1.13	
24308.	Gas Tubes, for above, each .....	.10	
24312.	Special Head for Serum Work, consisting of swinging rectangular boxes each carrying 12 or 24-10 cc glass tubes, particularly recommended as an accessory to the two smaller sizes of Large Universal Centrifuge.		
	Number of Tubes .....	72-10 cc	144-10 cc
	Duty Free .....	80.00	100.00
	Duty Paid .....	93.50	112.50
24316.	Centrifuge Tubes, of heavy well-annealed glass, cylindrical, with round bottom, for use in head illustrated above and as regularly supplied with the Universal Centrifuge.		
	Capacity, cc .....	50	100
	Each .....	.60	.80
		1.10	1.25
		1.75	2.00



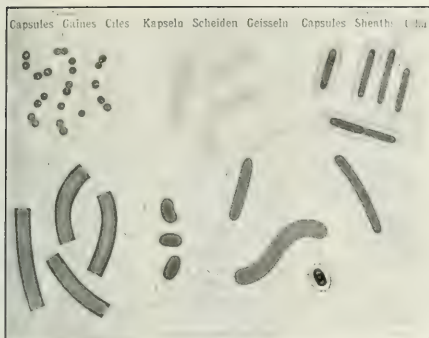
No. 24320



No. 24328

24320.	Centrifuge, Electric, High Speed, König, designed especially for serological work. With heavy armour plate cover and separate motor, all mounted on the same base board. A regulating resistance permits the reduction of speed from the maximum of approximately 8000 revolutions per minute to about 2000. With speed indicator as shown in illustration. Prices quoted are for motors for 110 volts direct current. For motor for 220 volts direct current prices are increased \$5.15 duty free and \$6.85 duty paid. For alternating circuits, both voltage and number of cycles must be given and price will be quoted upon application.				
	Capacity .....	4-15 cc tubes	6-15 cc tubes	4-30 cc tubes	6-30 cc tubes
	Duty Free .....	130.00	150.00	150.00	171.25
	Duty Paid .....	157.50	182.50	182.50	207.50
24324.	Special Glass Tubes for use with above centrifuge.				
	Capacity, cc .....			15	30
	Each .....			.20	.40
24328.	Centrifuge, Delepine 1913 Model, for independent drive, having a speed of 10000 r. p. m. with a light load and of 3000 to 4000 r. p. m. with a heavy load. In order to secure lightness, strength and absence of rusting, the rotor, buckets and tubes are made of Duralumin, an aluminum alloy having the strength of steel and only one-third its weight, which Prof. Delepine has selected after testing several metals and alloys and ascertained that it was capable of resisting the stress to which it had to be submitted. This metal is but slightly affected by organic fluids such as milk and has little action upon the bacteria. He has, therefore, designed tubes of Duralumin to take the place of the glass tubes generally used. These tubes are practically indestructible and, therefore, eliminate the loss of material due to breakage of the tubes, and also permit of certain adaptations which are not possible with glass. The centrifuge consists of a Duralumin rotor of special shape allowing the maximum number of tubes to be used and securing, when the disc or rotor is rotating rapidly, the most advantageous position of the tube in regard to equilibrium and safety. For 16 tubes of 100 cc each. These tubes have flat bottoms, for standing without support, and have consecutive numbers from 1 to 16 stamped upon them. Complete, without motor.				
	Duty Free .....	435.75		Duty Paid .....	522.90
24332.	Duralumin Tubes, 100 cc capacity.			Duty Paid, each .....	5.60
	Duty Free, each .....	4.65			





No. 24404. Series II, Chart 3

Series I, Chart No. 1. Forms of Bacteria.

" " " 2. Structure of Bacteria Cells.

" " " 3. Capsules, Sheaths and Cilia.

" " " 4. Division Gonidia.

" " " 5. Reproduction by Spores.

" " " 6. Ramification. Forms of Involution. Plasmoptysis.

Series II, Chart No. 1. Bacillus typhi abd. Agglutination. Bacteriolysis. Phagocytosis.

" " " 2. Staphylococcus pyogenes. Streptococcus pyogenes. Micrococcus catarrhalis. Micrococcus tetragenus.

" " " 3. Micrococcus gonorrhoeae. Micrococcus meningitidis. Diplococcus pneumoniae. Micrococcus melitensis.

" " " 4. Capsule cocci. Bacillus capsulatus Friedländer. Bacillus anthracis.

" " " 5. Bacillus tetani. Bacillus Chauveau. Bacillus oedematis maligni. Bacillus botulinus.

" " " 6. Bacillus aerogenes Welch. Bacillus pyocyaneus. Bacillus typhi abdominalis.

" " " 7. Bacillus diptheriae. Bacillus tuberculosis. Bacillus leprae.

" " " 8. Bacillus influenzae. Bacillus mallei. Bacillus pestis. Bacillus cholerae gallinarum.

" " " 9. Bacillus suisepitiscus. Bacillus suisepistifer. Bacillus rhusio pathiae suum.

" " " 10. Aktinomyces. Bacillus necroseos. Bacillus ulceria mollis.

" " " 11. Bacillus fusiformis. Vibrio cholerae. Spirillum gallinarum.

" " " 12. Spirillum febris recurrentis. Spirillum framboesiae tropicae. Spirochaete pallida.

Charts, as above, Series I	(6 charts), unmounted	9.00
" " " " " "	" " " " " " mounted on linen with rollers	13.50
" " " " " "	Series II (12 charts), unmounted	18.00
" " " " " "	" " " " " " mounted on linen with rollers	27.00

1. <b>Bacteria.</b>	10. <b>Anthrax</b> —kidney.
2. " "	11. <b>Chicken Cholera</b> —blood.
3. <b>Moulds.</b>	12. <b>Erysipelas</b> —blood of pigeon.
4. <b>Anthrax</b> —colony on gelatine.	13. " —liver of pigeon.
5. " —formation of spores.	14. " —spleen of pig.
6. " —blood.	15. <b>Staphylococcus</b> —culture in bouillon.
7. " —spleen pulp.	16. <b>Streptococcus</b> —culture in bouillon.
8. " —omentum.	17. " —kidney.
9. " —liver.	18. <b>Pneumococcus</b> —culture in gelatine.

125

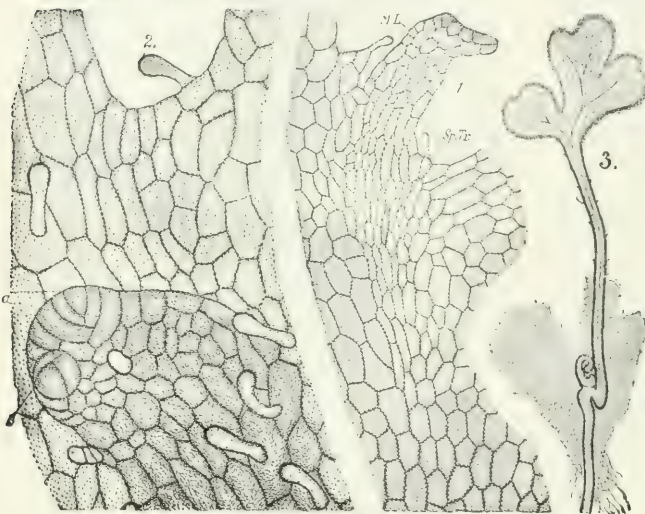


## Charts, Bacteriology, Roux (continued).

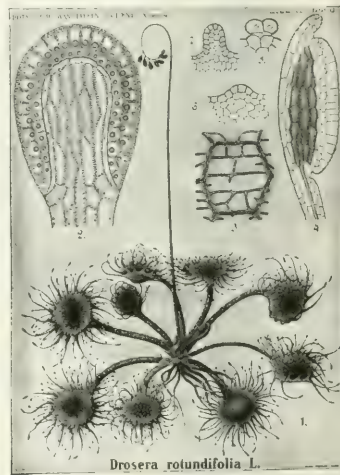
- |  |  |
|--|--|
| 19. <i>Pneumococcus</i> —blood.                              | 43. <i>Diphtheria</i> —culture on coagulated serum.          |
| 20. " —capsules, positive and negative.                      | 44. " — smear from fossil membrane.                          |
| 21. <b>Plague</b> —  | 45. " —section of trachea.                                   |
| 22. " —culture.  | 46. <b>Septic Vibrios</b> —flagella.                         |
| 23. " —blood from spleen.                                    | 47. " —peritoneal exudate.                                   |
| 24. " —smear from bubo.                                      | 48. <b>Symptomatic Anthrax</b> —peritoneal exudate.          |
| 25. " —omentum of rabbit.                                    | 49. <b>Tetanus</b> —bacillus with flagella.                  |
| 26. " —liver.  | 50. " —culture with spores.                                  |
| 27. <i>Bacillus Typhosus</i> —flagella.                      | 51. " —spores in phagocytes.                                 |
| 28. " —spleen.   | 52. <b>Cancer</b> —development of archoplasm.                |
| 29. <b>Cholera</b> —vibrions. Flagella.                      | 53. " —spermatogenesis of guinea pig.                        |
| 30. <b>Recurrent Fever</b> —blood.                           | 54. " —pseudo-coccidia.                                      |
| 31. <i>Gonococcus</i> —pus.                                  | 55. <b>Small pox</b> —cornua of rabbit.                      |
| 32. <b>Tuberculosis</b> —reaction in omentum.                | 56. " —pustule in skin of monkey.                            |
| 33. " —aviar, spleen of rabbit, giant cells.                 | 57. <b>Coccidia in rabbit</b> —life cycle (schematic.)       |
| 34. <b>Tuberculosis</b> —initial intravascular phagocytosis. | 58. " —adenoma of liver.                                     |
| 35. " —intravascular tubercle, 12th day.                     | 59. <b>Malaria</b> —haematozoan in fresh blood.              |
| 36. " —perivascular tubercle (kidney) 25th day.              | 60. " — blood after staining.                                |
| 37. " —ramified bacilli. Yellow degeneration.                | 61. " —development of <i>Haemamoeba relicta</i> in mosquito. |
| 38. " —encysted bacilli. Spleen of rodent.                   | 62. " — <i>Anopheles</i> and <i>Culex</i> .                  |
| 39. " —sputum.   | 63. <b>Trypanosoma in rat</b> —division.                     |
| 40. <b>Leprosy</b> —section of skin.                         | 64. " —agglutination.  |
| 41. <b>Glanders</b> —pus and section of lung.                | 65. " —tse-tse fly—division.                                 |
| 42. <b>Actinomycosis</b> —phagocytic reaction.               |  |

24408 Charts, complete set as above, duty free

75.00



No. 24412—Kny Botanical Chart



No. 24416

24412. Charts, Botanical, Kny, on heavy chart paper, printed in colors, 69 x 85 cm, with explanatory text. The old series consists of 100 charts in sections of 10 charts each (excepting sections VI and VII), each section being furnished in a portfolio and sold only by the section. For the new series see No. 24416.

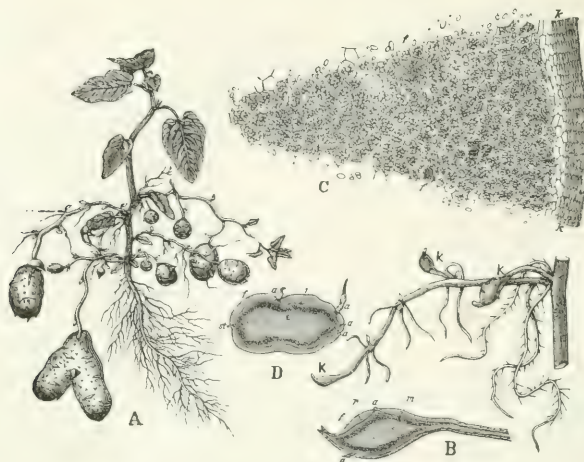
Section I, Charts I to X, in portfolio, duty free. 7.20

- I. Structure of the living plant cell and arrangement of its most important elements; the two chief kinds of protoplasmic movement inside a closed membrane, rotation and circulation and transition between the two.
- II. Structure and development of the starch grain.
- III. The chief forms of Calcium Oxalate crystals.
- IV. Chief stages in the conjugation of a large species of *Spirogyra*.
- V. Milk cells of *Euphorbia splendens* and *Lactuca sativa* L.
- VI-VII. A few of the most important forms of one-celled hairs.
- VIII. Longitudinal section through a dicotyledonous vascular bundle.
- IX. Vascular bundle from the interior of the stem of *Saccharum officinarum* L.
- X. Development of the embryo of *Brassica Napus* L.

Section II, Charts XI to XX, in portfolio, duty free. 7.20

- XI. Structure and development of the epidermis of *Ficus elastica*.
- XII. Portion of a transverse section of a leaf of *Pinus Laricio*.
- XIII. Stoma of *Thymus Serpyllum*, surface and transverse section.
- XIV. Transverse section through the vascular bundle of the petiole of *Polypodium vulgare*.
- XV. Part of a transverse section of a three year old twig of *Filia parvifolia*.
- XVI. Transverse section through vascular bundle from the stem of *Cucurbita Pepo*.
- XVII. Medium longitudinal section of the rapidly growing root-tip of *Secale cereale*.
- XVIII. Transverse section of a well developed radicle of *Secale cereale*.
- XIX. Development of the ovule of *Oenothera biennis*.
- XX. Ovule of *Viola tricolor* immediately after fertilization, drawn in median longitudinal section.





No. 24420—Frank and Tschirch, Botanical

24420. Charts, Plant Physiology, Frank and Tschirch, printed in colors upon heavy chart paper, 69 x 85 cm, each with explanatory text. These charts are furnished in six sections of 10 charts each, each section being furnished in a portfolio. They are sold only by the section.

Section I, Charts I to X, in portfolio, duty free..... 9.00

- I. Zones of growth in dicotyledonous plants.
- II. Root hairs.
- III. Mechanical tissue in monocotyledons.
- IV. Germination of corn.
- V. Potato tubers.
- VI. Origin, growth and separation of starch grains.
- VII. Structure of the leaf of *Beta vulgaris* (common beet).
- VIII. Appearance and division of the stomata.
- IX. Forms of stomata.
- X. Mycorrhiza of trees.

Section II, Charts XI to XX, in portfolio, duty free..... 9.00

- XI. The cell.
- XII. Multiplication of cells by division.
- XIII. The growing point and growth of the stem.
- XIV. Chlorophyll grains.
- XV. Spectra of chlorophyll, xanthophyll and of living leaves.
- XVI. " " alcoholic solutions of green and of etiolated leaves.
- XVII. Young stems of *Helianthus annuus* (Sunflower), first appearance of the ducts.
- XVIII. " " " " enlarged.
- XIX. Older stem of *Helianthus annuus* in transverse section.
- XX. " " " *Helianthus annuus*, enlarged.

Section III, Charts XXI to XXX, in portfolio, duty free..... 9.00

- XXI. Germination of the pea.
- XXII. Stem of *Linum usitatissimum* (flax) in cross section; rigidity by means of wood and bast ring.
- XXIII. Growth of a stalk of rye.
- XXIV. Fibro-vascular bundle and starch sheath of corn.
- XXV. Stoma of beet leaf, 1.
- XXVI. " " " 2.
- XXVII. Origin and appearance of root hairs.
- XXVIII-XXIX. Division of the nucleus.
- XXX. Chromoplasts.

Section IV, Charts XXXI to XL, in portfolio, duty free..... 9.00

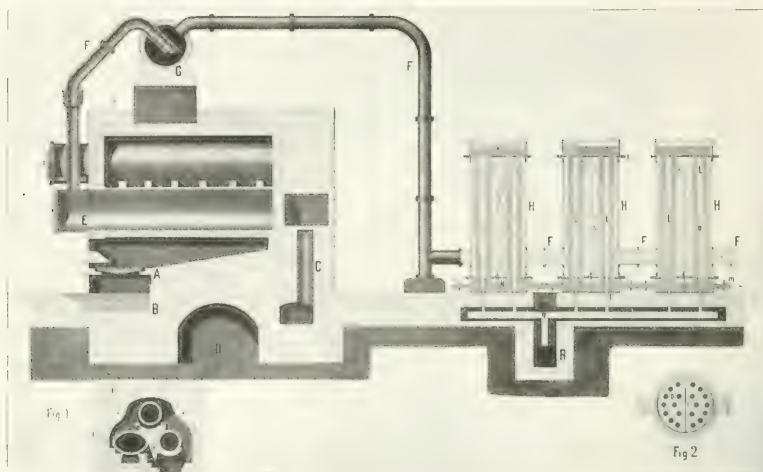
- XXXI. Germination of flax.
- XXXII. Root-tubercles of the lupine.
- XXXIII. " " " pea.
- XXXIV. Bacteria and symbiotic fungi of the Leguminosae.
- XXXV. The entrance of the symbiotic fungus into the lupine.
- XXXVI. " " " " " pea.
- XXXVII. Root tubercles of *Phaseolus nanus*.
- XXXVIII. Daily period of growth.
- XXXIX. Ring ducts.
- XL. Spiral ducts.

Section V, Charts XLI to L, in portfolio, duty free..... 9.00

- XLI-XLIV. Forms of starch grains.
- XLV. Transition from the primary structure of the root to the secondary and throwing off of the primary root.
- XLVI. Periderm (cork and cork formation).
- XLVII. Cork of the tubers of *Solanum tuberosum* (Potato).
- XLVIII. Callus of wounds and leaf scars.
- XLIX. Root systems of the Dicotyledons (lupine, mustard).
- L. " " " Monocotyledons (rye).







No. 24428

24428. Charts, Chemical Technology, von Schröder, size 106 x 78 cm. showing the more important manufacturing processes based upon chemistry. Mounted on linen with rollers.

### Series I.

- Chart 1. Production of sulphur.  
 " 2. Refining crude sulphur.  
 " 3. Preparation of nitric acid.  
 " 4. Preparation of sulphurous acid by combustion of pyrites for use in the manufacture of sulphuric acid.  
 " 5. { A. Furnace for lump pyrites.  
 B. Furnace for fine pyrites.

### Series II.

- Chart 6. Sulphuric acid factory, ground plan.  
 " 7. Sulphuric acid factory, vertical section.  
 " 8. Details in the process of manufacturing sulphuric acid.  
 " 9. Concentration of acid.  
 " 10. Preparation of fuming sulphuric acid.

### Series III.

- Chart 11. Salt Garden.  
 " 12. Graduation house.  
 " 13. Salt boiling.  
 " 14. Soda manufacture.  
 " 15. Condensation of muriatic acid.

### Series IV.

- Chart 16. } Manufacture of illuminating gas.  
 " 17. }  
 " 18. }  
 " 19. Manufacture of phosphorus.  
 " 20. System of generative heating, Siemens'.

### Series V.

- Chart 21. Gas generator.  
 " 22. Glass-potfurnace.  
 " 23. Glass-troughfurnace.  
 " 24. Glass-stretching furnace (for making plate glass).  
 " 25. Hoffman's ring furnace.

### Series VI.

- Chart 26. Lime kiln.  
 " 27. Manufacture of porcelain.  
 " 28. Manufacture of sodium.  
 " 29. Manufacture of aluminum.

### Series VII.

- Chart 31. Charring of wood.  
 " 32. Coke furnace.  
 " 33. Furnace for roasting iron ores.  
 " 34. Iron-blast furnace (Hochofen).  
 " 35. Blast super heater (Winderhitzer).

### Series VIII.

- Chart 36. Fresh fire (Frischfeuer).  
 " 37. Puddling furnace.  
 " 38. Bessemer pear.  
 " 39. Martin furnace.  
 " 40. Rolling mill.

### Series IX.

- Chart 41. Lead furnace.  
 " 42. Silver furnace.  
 " 43. Copper furnace.  
 " 44. Zinc furnace.  
 " 45. Mercury furnace.

### Series X.

- Chart 46, 47. Semet-Solvay coke ovens.  
 " 48. Pure Aluminum, Calcium Carbide.  
 " 49. Carbon Bisulphide I.  
 " 50. " II.

Charts, as above, in lots of not less than five, each duty free..... 1.35  
 " " " " " any series of five, duty free..... 6.00

24432. Chart, the Elements and their Atomic Weights, as adopted by the International Committee, 62 x 62 inches, mounted on linen..... 4.00  
 24436. Chart, as above, mounted on linen with wooden rollers..... 5.00  
 24440. Chart, Periodic Arrangement of the Elements, Mendelejeff, latest arrangement by Baskerville, mounted on linen..... 2.00  
 24444. Chart, as above, mounted on linen with wooden rollers..... 2.50



No. 24448. Series 2, Chart I

No. 24448. Series 1, Chart IV

24448. Charts, Parasitic Protozoa and their Carriers, Dönitz and Hartmann. This publication is to eventually include 18 to 20 charts, of which 10 to 14 charts will be devoted to Protozoa, Series I, and 6 to 8 charts to their carriers, Series II. At the present time 9 charts of Series I, as per list below, have been issued and 2 charts only of Series II, the work having been interrupted because of Dr. Hartmann's absence in South America. Series I charts are 120 x 160 cm and Series II charts are 90 x 120 cm. They are carefully executed in colors.

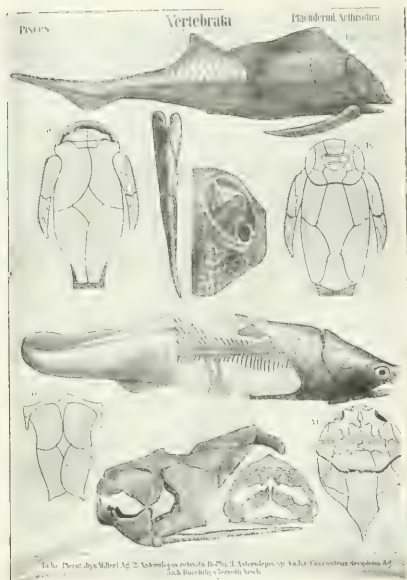
Series I, Chart	I. Chlamydothryx encicelys (Ehrbrg.).
" "	II. Trichomastix lacertae (Bütschli).
" "	III. Leucozytozoon Ziemanni (Lav.).
" "	IV. Plasmodium vivax (Grassi et Fel.).
" "	V. Lamblia muris. Lamblia intestinalis. Trichomonas intestinalis. Nyctotherus faba. Balantidium minutum. Balantidium coli.
" "	VI. Haemoproreus columbae.
" "	VII. Trypanosoma lewisi.
" "	VIII. Entamoeba tetragena (Viereck). Entamoeba histolytica (Schand).
" "	IX. Leishmania donovani (Lav. u. Mesn.).
Series II, Chart	I. Glossina palpalis (Robin Desv.) ♀. Glossina morsitans (Westw.) ♂.
" "	II. morsitans Details. Glossina fusca (Welk).

24448. Charts, as above, unmounted, each duty free..... 3.00  
 " " mounted on linen with rollers, each duty free..... 3.75

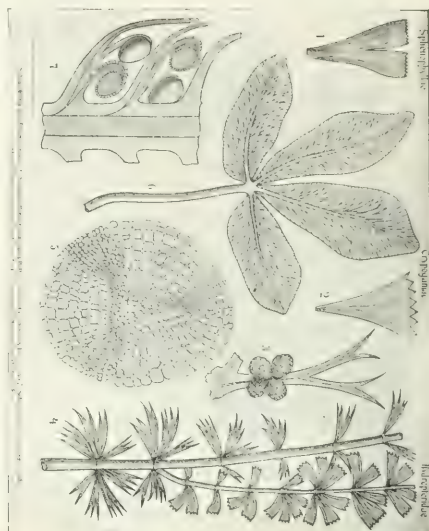
24452. Charts, Haematology and Cytology, Landouzy and Labbe. These charts are prepared under the direction of the Pasteur Institute, Paris, and are finely executed in colored lithographs on heavy paper with stout binding and eyelets for hanging. Size 80 x 62 cm.

Normal Blood	Serum
I. Leucocytes.	I. Blood Serum.
II. " "	
III. " "	
IV. Spectrum.	
Pathological Blood	Blood in Disease
I. Variole.	I. Primary Tuberculosis of the Pleura.
II. Lymphatic Leucemia.	II. Secondary Tuberculosis of the Pleura.
III. Myelogenous Leucemia.	III. Hydrothorax.
IV. " "	IV. Pleurisy due to Pneumococcus.
V. Disturbances of Hematias.	V. Sarcomatous Pleurisy.

24452. Charts, as above, complete set, duty free..... 20.00



No. 21456



No. 21456

24456. Charts, Paleontology, Zittel and Haushofer, consisting of 83 charts, 100 x 140 cm, mounted on linen with rollers, illustrating fossil animals and including 8 ideal landscapes after Haushofer. The ideal landscapes consist of Charts Nos. 6, 7, 8, 9, 26 and 40, as follows:—

- Chart 6. Carbonic Era:—Calamites, Ferns, Pecopteris, Neuropteris and other plants of this period.  
 7. Oblique Period:—Palms, Flabellaria, Phoenixites, Anthracopterium, etc.  
 8. Carbonic Era:—Ligularia, Lepidodendron.  
 9. Jurassic Era:—Sponges, Corals, Lepidodus, Ammonites, Cycad and Pterodactyl.  
 26. Glacial Period:—Alps showing glaciation, motaines, reindeer, tennung and mammoth  
 40. Cretaceous Era:—Cypress, Arancaria, Segovia, Cretneria, Iguanodon.

The contents of the entire series is given below, with the chart numbers:—

	Chart		Chart
Amblypoda.....	56.	Knidaria.....	75.
Amphibia.....	42, 43.	Lamellioranchiata.....	18, 32, 33.
Anthozoa.....	3, 4, 75.	Litopterna.....	66.
Arthropoda.....	30, 31, 82, 83.	Mammalia.....	54, 55, 56, 57, 58, 61, 62, 63.
Artiodactyla.....	67, 68, 69, 70.	Mammoth Hot Springs, Yellowstone Park.....	20.
Aves.....	53.	Marsupialia.....	54.
Blastoidea.....	12.	Mollusca.....	18, 19, 21, 22, 23, 24, 25, 37.
Brachiopoda.....	5, 17, 77.	Molluscoidea.....	5, 16, 17, 77.
Bryozoa.....	16.	Palechinoidea.....	13.
Carnivora.....	71, 72.	Perissodactyla.....	59, 64, 65.
Castle Geyser.....	41.	Phytenomorpha.....	45.
Cephalopoda.....	19, 21, 22, 23, 24, 25.	Pisces.....	34, 35, 36, 37, 38.
	26, 28, 29, 70, 80, 81.	Proboscidea.....	57, 64.
Cheilostomata.....	16.	Protozoa.....	1, 74.
Coelenterata.....	2, 3, 4, 75, 76.	Pterosauria.....	35.
Condylarthra.....	55.	Radiolaria.....	74.
Crinoida.....	10, 11.	Reptilia.....	39, 44, 45, 46, 47, 48, 49.
Crocodylia.....	49.		50, 51, 52, 59, 60, 73.
Crustacea.....	50, 51, 52, 53.	Rhizopoda.....	1.
Cyclotomata.....	16.	Rhynchocephalia.....	49.
Cystoidea.....	12.	Rudistae.....	33.
Dibranchiata.....	28.	Sauropterygia.....	45.
Dinosauria.....	39, 50, 51, 59, 60.	Sclerophoda.....	45.
Echinodermata.....	10, 11, 12, 13, 14, 15.	Schalenbau.....	78.
Echinoidea.....	10, 11.	Selachii.....	34.
Edentata.....	61, 62, 63.	Sengien.....	32.
Euechinoidea.....	13, 14, 15.	Sterecephali.....	42, 43.
Foraminifera.....	1, 74.	Testudinata.....	42.
Ganoidi.....	37.	Tetrabranchiata.....	19, 21, 22, 23, 24, 25, 27, 79, 80, 81.
Gastropoda.....	29.	Theromorphae.....	46, 73.
Graptolidea.....	76.	Toxolentia.....	35.
Hydrozoa.....	76.	Trilobitae.....	30, 82, 83.
Ichthyosaura.....	45.	Vertebrata.....	34 to 39, 42 to 73.
Ideal Landscapes.....	6, 7, 8, 9, 26, 40.		

24456. Charts, as above, Nos. 1 to 83, with the exceptions noted below, each duty free..... 1.65  
 " Nos. 6, 7, 8, 9, 26, 40 and 74 to 83, each duty free..... 1.80  
 " Nos. 20 and 41, each duty free..... 2.10  
 " Complete set, Nos. 1 to 83, duty free..... 138.30

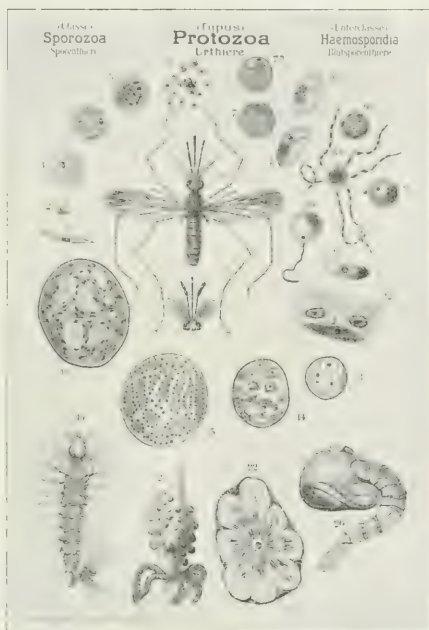








No. 24480. Series I, No. 27



No. 24480. Series I, No. 102

# Charts, Zoology, Leuckart-Chun (continued).

- Class—Sporozoa**  
**Order—Gregarinida**  
**Series I, Chart 23.** Polycystidea, Monocystidea, Actinoccephalus oligocanthus, Gonospora terabellae, Clepsidrina polymorpha, Urospora, Nemertis, Clepsidrina blattarum, Stylorhynchus longicollis, Gamocystis tenax, Coccidella among the Monocystidea.
- Order—Haemosporidia**  
**Chart 102.** Life-cycle of Plasmodium praecox, showing sporozoite, schizont, schizogonia (merozoites), macrogamete, microgametoblast, ookinete, microgametes, oöcyst, sporoblasts, and various intervening stages and processes.—Anopheles claviger,—female, head of male, larva, nymph, stomach with oöcysts, cross-section of saliva duct with sporozoites of Plasmodium.
- Order—Coccidida**  
**Chart 103.** Life-cycle of Coccidium schubergi, parasitic in Lithobius forficatus, showing sporozoites, schizont, merozoites, macrogamete, microgametoblast, microgametes, oöcyst, sporocyst, and various intervening steps. Development stages of Adeles ovata, showing microgametocytes, etc. Section of liver of rabbit with Coccidium oviforme. Section of kidney of snail with Klossia helicina.
- Class—Infusoria**  
**Orders—Flagellata, Choanoflagellata**  
**Series I, Chart 75.** Mastigamoeba aspera, Oikomonas termo, Nonas guttula, Cercomonas longicauda, Anthophysa vegetans, Synura uvella, Tetramitus rostratus, Mesostoma intestinalis, Trichomonas vaginalis, Haematococcus, Euglena spirogyra, E. viridis, Ureolus alenizini, Trachelomonas lipidica, Chilomonas paranacium, Dinobryon sertularia, Anisouema grande, Cryptomonas ovata, Polytoma uvella, Codosiga botrytis.
- Orders—Flagellata, Dinoflagellata, Cystodagellata**  
**Chart 76.** Volvox globator, Goniodoma acuminata, Ceratium hirudinella, Glenodinium cinetum, Ceratium furex, Dinophysis acuta, Gymnodinium spirale, Noctiluca miliaris.
- Order—Ciliata**  
**Chart 65.** Holotricha, Heterotricha, Hypotricha:—Parodon teres, Cyclidium glaucoma, Colpoda cucullus encysted, Paramacium caudatum, Frontonia leucas, Paramacium putrinum, Stentor polymorphus, S. coerulescens, Stylonychia mytilus.
- Chart 67.** Oligotricha, Peritricha:—Tintinnopsis boroidea, Dictyocysta tiara, Carcelium polypinum, Vaginicola longicollis, Vorticella microstoma, Spirobona gemmipara.
- Order—Suctorio (—Ainetaria)**  
**Chart 68.** Podophrya fixa, P. libera, P. quadrifaria, Epheleto gemmipara, Dendrocometes paradoxus, Dendrosoma radicans, Acineteta tuberosa, Stylonychia mytilus with parasitic Sphaerophryae, Ophryodendron abietinum.

## II. TYPE—COELENTERATA (ZOOPLANKTON)

### Sub-type—Porifera Sponges

#### Class—Spongiae

##### Order—Fibrospongiae

- Series I, Chart 35.** Myzoz pongoia, Ceratospongiae, Monadenellidae:—Haliareca dujardini, Euspongia officinalis, Hircinia setosa, Aplysilla tenella, Darwinella aurea, Spongia lacustris, S. fluviatilis, S. lieberkühni, Rinalda arctica, silicious spicules of Monactinellidae.

## Charts, Zoology, Leuckart-Chun (continued)

## Order—Tetraetnellidae

- Series I, Chart 47. Tethya maza, Tetilla polyura, Tisiphonia fenestrata, Aglardiella radiata, Corticium candelabrum, Plakina monolopha, Gredia placenta, Caminus vulcani, Plakina trilopha, Stelletta mammillaris, Corticium versatile, Ancorina verrucosa, Tisiphonia agariciformis, Chondrilla phylloides.

## Order—Lithistidae

- " Chart 52. Leioderma lyncus, Selischothorhonnelleides, Discoderma calyx, D. japonica, Corallistes pratii, Kaliopsis cidaris, spicules.

## Order—Hexactinellidae

- " Chart 50. Hyalonema mirabile, Holtenia carpenteri, Pheronema hemisphaericum, Rossella velata, Pheronema annae Crateromorpha, Euplectella subera, E. aspergilum, characteristic spicules.

- " Chart 50. *Lysaccina*:—Antiochone cylindrica, Rhabdodictyum, delicatum; *Dictyonina*.

## Order—Calcispongiae

- " Chart 54. Olynthus primordialis, Ascaltis gegenbauri, Sycurus primitivus, various forms of spicules, Sycandra raphanus.

## Sub-type—Cnidaria (Corals, etc.)

## Class—Hydrozoa

## Order—Hydroidea

- Series I, Chart 16. Hydra viridis, H. fusca, Cordylophora lacustris, Podocoryne carnea, Corymorpha nutans; diagrammatic sections of typical Hydroids.

- " Chart 20. Hydra viridis, Hydra vulgaris var. aurantiaca, Hydra grisea.

## Order—Hydromedusae

- " Chart 18. Carmarina hastata, C. fungiformis, Hippocrene supercilialis, Bougainvillea supercilialis.

## Order—Siphonophora

- " Chart 96. Agalma sarsi, siphonophores of the family Calycophoridae, Praya galea, Abyla pentagona, Eudoxia cuboides, Monophyes primordialis, Eudoxia eschscholtzi Halistemma pictum, Diphyes sieboldii.

## Order—Aculephae (Jelly-fish)

- " Chart 64. Aurelia aurita,—Mastrula fixed with commencing stomodaeum, polyp with 4 tentacles, with 8 tentacles, Scyphistoma with 16 tentacles, Strobila with only one Ephyra, Scyphistoma with 6 segments; Aurelia flavidula.

## Class—Anthozoa (Corals)

## Order—Octactinia (= Alcyonaria)

- Series II, Chart 1. Single zooid of an Octactinian; Corallium rubrum.

- " I: Chart 94. Pennatula phosphorea, Renilla reniformis, cross section of a polyp, cross-section of stalk of Pennatula.

## Class—Ctenophora

- " Chart 74. Hormiphora plumosa, Bolina hydalina, Cestus veneris, Vexillum parallelum, Beroe ovata, Beroe forskalii.

## III. TYPE—ECHINODERMATA

- Series I, Chart 79. *Development of the Larval Forms of Echinoderms*: Simplest larval form, Development of the Holothurian larva Auricularia, of the Asteroid larva Bipinnaria, and of the Pluteus larva.

- " Chart 80. Development of Holothuria tubulosa, Cucumaria doliolium, Synapta digitata, Echinus miliaris, Arbacia, Asterina gibbosa.

## Sub-type—Pelmatozoa

## Class—Crinoidea

## Order—Brachiata

- Series I, Chart 5. Ithizocinus lofotensis. Small individual, crown of a full-grown specimen, calyx from above, section of crown section through an arm.

- " Chart 7. Antedon rosaceus,—Full-grown animal, calyx from dorsal side, arrangement of fibrous strings, larvae.

## Class—Blastoidea

## Order—Regulares

- Series I, Chart 46. Pentremites sulcatus, P. pyriformis, P. godoni, Codaster hindei, Orophocrinus stelliformis, Granatocrinus derblensis;

## and Order—Irregulares

- " " Astrocrinus henniei.

## Sub-type—Asterozoa

## Class—Ophiuroidea

- Series I, Chart 59. Ophiura, Ophiocoma, Ophiomyxa, Ophiotrix, Ophioglypha, Ophiarachna.

## Class—Asteroidea (Starfishes)

- Series I, Chart 86. Asteracanthion rubens, pedicellaria, Astropecten hemprichii, Echinaster sentus.

## Sub-type—Echinozoa

## Class—Echinoidea (Sea-urchins)

- Series I, Chart 81. Sea-urchin with lower floor removed, Arabic punctulata, Echinus acutus, Dorocidaris papillata, Arbacia pustulosa.

## Class—Holothuroidea (Sea-cucumbers)

- Series I, Chart 61. Anatomy of a Holothurian of the family Aspidochirotae; gullet of a dendrochirote Holothurian and of Synapta; Holothuria impatiens, Cucumaria, Chirodota.

## IV. TYPE—VERMES (WORMS)

## Class—Platodes

## Order—Tremstoda

- Series I, Chart 62. Tristomum coelestem, T. papilosum, Gyrodactylus elegans, Polystomum integerrimum, Octobothrium lanceolatum, Diplozoon paradoxum, Dipora.

- " Chart 33. Distomum hepaticum, Distomum lanceolatum.

- " Chart 73. Distomum macrostomum, D. clavigerum, Cercaria macrocerca, D. echinatum.

## Order—Cestoda

- " Chart 15. Taenia saginata, Taenia solium.

- " Chart 44. Bothrioccephalus latus, Tetrahynebidae, Caryophyllaeus mutabilis.

- " Chart 99. Development of Taenia echinosoccus, adult Taenia, genital organs of a young segment, Cysticercus condition Coenurus cerebralis; Taenia serrata; Cysticercus plasmis, headhooks on the Cysticercus, head young Taenia serrata; development of the Cystoid tapeworms, Taenia cucumerina, young segment of same, Cysticercoid egg of same, Cysticercus artonis, etc.

## Charts, Zoology, Leuckart-Chun (continued)

- " Chart 28. Planaria polychroa, Dendrocoelum lacteum, Eurylepta orbicularis, Vortex viridis, Mesostomum ehrenbergi, Microstomum lineare.

- " Chart 39. Nemertes nesii, Amphiporus lactifloreus, Tetrastemma flavidum, development of Nemertes out of the Pilidium Lineus obscurus.

## Class—Nemathelminthes

## Order—Nematoda

- Series I, Chart 31. Ascaris lumbricoides, Oxyurus vermicularis, Dochmius duodenalis, D. trigenocephalus, Anguillula intestinalis,

- " Chart 66. Trichocephalus dispar, T. affinis, Trichosomum crassicauda, Trichina spiralis, meat containing Trichina.

- " Chart 49. Heterodera schachtli.

## Order—Acanthocephala

- " Chart 100. Male Echinorhynchus gigas, male Echinorhynchus angustatus, female genital apparatus of E. gigas nephridia of same, oviduct of E. angustatus, and ligamentum suspensorium, section through ovary, egg of E. moniliformis, embryo of E. gigas and of E. angustatus, larvae.

## V. TYPE—ANNELIDA (ANNELIDS)

## Class—Chaetopoda

## Order—Polychaeta

- Series I, Chart 56. Eteanthis:—Nereis (Leontis) dumerili, Heteronereis oerstedii, Nereis pulsatoria, N. striolata, Aleciopa cantrainii, Tomopteris euchaeta.

- " Chart 57. Seleniteris:—Arenicola piscatorum, Phyllochaetopterus major, Spirobranchus laevis, Serpula vermicularis, Sabellaria alveolata, Paysonbranchus proteus, Myxicola infundibulum.

## Order—Oligochaeta

- " Chart 19. Lumbricus riparius, L. agricola, Criodrilus lacuum, Lumbricus communis, L. olidus, Lumbricus trapezoides, on Chart 24 following.

## Class—Hirudinea = Discophora

- Series I, Chart 24. Hirudo medicinalis, Pisciola.

## Class—Gephyrea

## Orders—Sipunculoidea, Echiuroidea

- Series I, Chart 55. Sipunculus nudus, Echiurus pallasi, Bonellia viridis, Sternaspis spinosus, Actinotrocha-larva of Phoronis.

## Class—Rotifera, incl. Gasterotricha

- Series I, Chart 51. Hydatina senta, Stephanoceros eichhorni, Melicerta ringens, Rotifer vulgaris, Notommata sieboldi, Chaetonotus maximus.

## VI. TYPE—MOLLUSCOIDEA

## Class—Bryozoa

## Orders—Endoprocta, Ectoprocta

- Series I, Chart 34. Pedicellina echinata, Flumarella repens, stages of statoblasts of Alecyonella fungosa in section, Alecyonidium mytili, Bowerbankia densa, Acamarchis avicularia, Flustra membranacea.

## Class—Brachiopoda

## Order—Testicardines

- Series I, Chart 95. Waldheimia australis, and anatomy, Terebratulina vitrea, Argiope neapolitana, larva, Terebratulina minor, Argiope kowalevskii;

- " Chart 101. Lingula anatina, and Order—Ecardines

- Lingula anatina,—Anatomy in detail.

## VII. TYPE—MOLLUSCA (SHELL-FISHES)

## Class—Lamellibranchiata (Bivalves)

## Order—Asiphonida

- Series I, Chart 12. Margaritana margaritifera, development of Unio pictorum.

- " Chart 60. Ostrea edulis,—longitudinal sections, cross-section of larva ready to swarm, side view of same, heart, blood corpuscles, ball of sperm, spermatozoan, and mature eggs.

- " Chart 77. Pecten jacobaeus, Arca none, Mytilus edulis, Spondylus gaederopus.

## Order—Siphonida

- " Chart 89. Cardium tuberculatum, pericardial chamber of Venus verrucosa, Pholadidea, Teredo and larva, hinge of Trigonia, Chondrophore of Mya truncata.

## Class—Scaphopoda (Tooth shells)

- Series I, Chart 92. Anatomy and development of Dentalium entalis.

## Class—Gastropoda (Univalves)

## Order—Pulmonata

- Series I, Chart 30. Anatomy of Helix pomatia. Helix nemoralis, Limnaea stagnalis, arion empiricorum.

## Order—Opisthobranchiata

- " Chart 8. Pontolimax capitatus, Eolis, Doris, Polyera quadrilineata, Pleurobranchus, Aplysia punctata.

- " Chart 43. Creseis acicula, Cymbula peroni, larva, Clione borealis, Clionopsis krohni, larva of Clione and Paeumodermon, Firola (Pterotrachea) coronata, Firolaides leseuei, Atlanta peroni.

## Class—Cephalopoda

## Orders—Tetrabranchiata and Dibranchiata

- Series I, Chart 14. Anatomy of Octopus vulgaris, head-cartilage of Sepia officinalis, brain of Sepia, section through eye of Sepia and of Nautilus pompilius.

- " Chart 36. Nautilus pompilius, Spirula prototypus, shell of Spirula peroni, male Argonauta argo, female of same, heterotylus of Octopus carenne, spermatophore of Sepia officinalis.

## VIII. TYPE—ARTHROPODA

## Sub-type—Branchiata

## Class—Crustacea

## Sub-class—Entomostraca

## Order—Phyllopoda

- Series I, Chart 26. Apus canceriformis, Apus proutii, Branchipus stagnalis, Daphnia pulex, Polyphemus oculus.

## Order—Copepoda

- " Chart 25. Canthocamptus minutus, Cyclops canthocarpoides, Cyclops tenuicornis, Achteres percarum, Argulus foliaceus.

## Order—Cirripedia



## Charts, Zoology, Leuckart-Chun (continued)

- Series I, Chart 87. Anatomy and development of the *Lepadidae*.—Lapas anatifera, entire section, embryo, Cypris stage, section of further developed Lepas, ripe young Lepas. Anatomy and development of the *Balanidae*.—Balanus tintinnabulum, Nauplius larva of Balanus balanoides, Cypris stage, young Balanus; Ibla cumingi.
- " Chart 85. *Rhizocephala*.—Carcinus maenas with a mature Sacculina carcini *in situ*; development of the Sacculina, Nauplius stage, first moult. Cypris stage, Cypris working its way into the body of the crab, young Sacculina, older Sacculina interna, cross section, longitudinal section, mature Sacculina externa.
- Sub-class—Malacostraca**  
**Order—Stomatopoda**
- Series I, Chart 95. Squilla mantis.—Adult, side view, back view, cut open, transverse section through abdomen, mouth parts, three stages in development, Erichthoid larva, older Squilloid larvae.
- Order—Decapoda**
- " Chart 91. *Macrura*.—Larval history of Penaeus, Nauplius, youngest Zoea stage, older Zoea larva, older Panaeus larva, same more developed; Zoea forms of other Decapoda, of Galathea, of Pagurus; young Homarus and larva; larva of Astacus fluviatilis. *Brachyura*.—Youngest Zoea of Thia, older Zoea of Maia.
- " Chart 82. Astacus fluviatilis.—Longitudinal section of male, section of cephalothorax, mouth parts, stomach, circulatory system, male genital apparatus, female genital apparatus, section through eye, inner antenna.
- Order—Arthropoda**  
**Sub-order—Isopoda**
- " Chart 3. Asellus aquaticus.—male, central nervous system, female, anatomy, embryo; Porcellio scaber.—animal groups of segments, incubatory pouch.
- " Chart 88. Etoniscidae.—Development of Capon elegans, second larval form, male and female, ventral views; female, dorsal view; Postunium maenadis, P. kosmanni, Cancerion miser.
- Sub-order—Amphipoda**
- " Chart 4. Gammarus neglectus, Pbronia sedentaria, Caprella.
- Class—Acerata**  
**Sub-class—Merostomata**  
**Order—Xiphosura**
- Series I, Chart 90. Limulus polyphemus.—Longitudinal section of body, transverse section of cephalothorax, of female Limulus, circulatory and nervous systems, genital organs, young Limulus.
- Sub-class—Arachnida**  
**Orders—Scorpionida, Pseudoscorpionida, Cyphophthalmida**
- Series I, Chart 45. Inner structure of Butkus; Buthus afer, B. occitanus, Scorpio italicus, Chelifer caneroides, Gibocellum seducticum.
- Order—Araneida**
- " Chart 42. Inner structure of a female dipneumon Araneid; Epeira diadema, Segestria senoculata, Tegenaria, Zilla calophylla, Anyphaena accentuata, Philocea domesticus, Agalena labyrinthica.
- Order—Acarina**
- " Chart 48. Metamorphosis of Trombidium fuliginosum; Tyroglyphus siro, Trichodactylus anonymus.
- " Chart 58. Sarcopites scabei var. hominis, S. mutans, Chorioptes spatuliferus, Psoreptes longirostris, Analges passerinus; Desmodex folliculorum.
- Order—Linguatulida**
- " Chart 63. Linguatula (Pentastomum) taeniodes, Pentastomum denticulatum, P. torquatum, P. multicinctum, P. constrictum.
- Sub-type—Tracheata**  
**Class—Protracheata**  
**Class—Myriopoda**  
**Orders—Chilopoda, Symphyla, Pseudoscorpionida**
- Series I, Chart 32. Lithobius forficatus, Scolopendra borrioides, S. complanata, Geophilus, Scolopendrella, Pseudoscorpion.
- Orders—Diplopoda, Onychophora**
- " Chart 38. Polodemus complanatus, Lysipetalum insculptum, Tulus londinensis, Glomeris marginata, Strongylosoma guerini (also Peripatus capensis).
- Class—Insecta**  
**Order—Orthoptera**
- Series I, Chart 11. Migratory locust, Gdipoda stridula, body of Acridium tartaricum, mole-cricket, grass-hopper.
- " Chart 22. Pelariis, Ephemeridae, Libellulidae, Agrion puella.
- " Chart 83. Termes lucifugus, Eutermes from Borneo, Termes from Java.
- Order—Rhynchoptera**
- " Chart 17. Phylloxera vastatrix.—Vine leaf covered with galls of Phylloxera, development, apterous sexual generation, male and female generation, root-attacking generation and egg, winged generation, subterranean pupa. Map of France showing distribution of Phylloxera.
- Order—Neuroptera**
- " Chart 9. Megaloptera, Chrysopa flavifrons, Trichoptera, Strepsiptera.
- Order—Coleoptera**
- " Chart 6. Potato beetle (Leptodermes decemlineata).
- " Chart 78. Hylesinus piniperda, Bostrychus typographus, galleries in trunk of a fir tree, Bostrychus laricis, Ecceptogaster scolytus, Clerus formicarius.
- " Chart 84. Organs and metamorphoses of European May-beetles (Melolontha vulgaris and M. hippocastani).
- Order—Diptera**
- " Chart 70. Musca (Calliphora) vomitoria. Sarcophaga carnaria, Musca domestica.
- Order—Lepidoptera**
- " Chart 21. Cabbage Butterfly (Pieris brassicae), Goat Moth (Cassus ligniperda), caterpillar of Bombyx pini, silk glands, etc., head of larva of Aporia crataegi, head of imago of Sphinx pinastri, scales from butterflies' wings, alimentary canal of imago of Sphinx atropes, egg of Smerinthus populi showing micropyle.
- Order—Hymenoptera**
- " Chart 41. Galls, adult insects etc., of certain Gall-Wasps of the oak.
- " Chart 37. Honey bee (Apis mellifica).
- " Chart 97. Anomalon circumflexum, Gastropacha pini, Microgaster nemorum, Teleas phalae nstrum, larva of Platygaster.

## IX. TYPE—CHORDATA (VERTEBRATES)

## Sub-type—Acrania

## Class—Hemichordata

- Series I, Chart 93. Balanoglossus kowalewskii.—Development, organization of larva.

## Class—Tunicata (Urochordata)

## Sub-class—Copepoda (Larvacea)

- Series I, Chart 71. Appendicularia and tadpoles of Ascidiae, Oikopleura cophocerca, Stegosoma pellucidum, Clavellina lepadiformis.

# Charts, Zoology, Leuckart-Chun (continued)

## Sub-class—Ascidacea

- Series I, Chart 53. Anatomy of *Ciona intestinalis*, *Corella parallelogramma*, *Clavellina padiformis*, development stages of the simple Ascidians.

## Sub-class—Thaliacea

- Series I, Chart 40. *Doliolum mülleri*, *D. ehrenbergi*, *Salpa pinnata*, *Salpa democratica-mucronata*.

## Class—Cephalochordata

- Series I, Chart 72. Development of *Amphioxus lanceolatus*.

## Sub-type—Craniata

### Class—Pisces

- Series II, Chart 1. Electric organs of *Torpedo marmorata*, *Gymnotus electricus* and *Malapterurus electricus*, pseudo-electric organs of *Mormyrus* and *Raja clavata*.

### Order—Elasmobranchii

- Series II, Chart 2. Embryonic development of *Plagiostomata*: Belfour's stages B to K.  
 " Chart 3. Sections of early stages (to stage C.)  
 " Chart 4. Sections of later stages (from stage D.)  
 " Chart 12. Skeletons of *Acanthias*, dorsal and side view of skull of *Notidanus cinereus*, tooth of *Acanthias* and of *Notidanus*. (Double chart).

### Order—Dipnoi

- Series II, Chart 10. Various specimens of *Ceratodus*, *Protopterus annectens*.

### Class—Amphibia

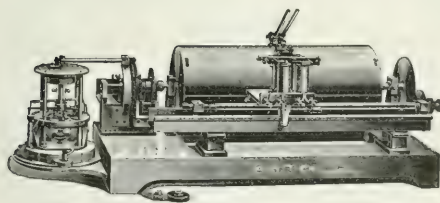
#### Orders—Anura, Urodela

- Series II, Chart 5. Embryonic development of *Rana temporaria* and *Triton*, in detail, earlier stages.  
 " Chart 9. Embryonic development of *Rana temporaria*, *R. esculenta*, *Bombinator*, and *Triton*, later stages (in continuation of preceding chart).  
 " Chart 69. Metamorphosis of the Common Frog (*Rana temporaria*).  
 " Chart 6. Skeletons of *Batrachia*, *Rana temporaria*, *esculenta* and *tigrina*, details.  
 " Chart 11. Intestinal tract of larval *Pelobates fuscus*, and *Rana esculenta*, jaw of last, dissection of pyloric tract, pharynx of newly hatched *Bufo vulgaris*, etc.  
 " Chart 10. Vascular system of amphibia, —aorta with branchiae, heart and arteries, venous system, section of heart of frog.  
 " Chart 8. Nerve system, —brain and spinal cord of *Rana temporaria*, sections of brain, sympathetic system, brain of larva of *Bombinator igeus*, spinal cord of *Rana esculenta*, sense organs of lateral line of head of larval *Triton taeniatus*.  
 " Chart 7. Urogenital system of Amphibia, —segment-canal from kidney of larval *Siphonops*, urogenitalia of male *Rana temporaria* and *R. esculenta*, and of female of either species, diagrams of male and female urogenital systems of *Triton taeniatus*.

### Class—Mammalia

#### Order—Primates

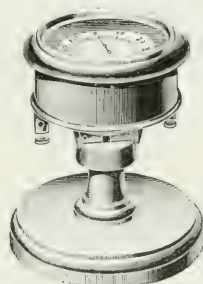
- Series II, Chart 37. *Gorilla eugena*, skull of adult male *Gorilla*, head of adult male *Chimpanzee*, skull of an adult male *Orang-outang*, head of *Semnopithecus nasicus*.



No. 21184



No. 24490



No. 24496

24484. Chronograph, registering, with electric motor and regulator after Thury, with three speeds, i.e., one rotation every minute, one every ten seconds, or one every second; electro marking magnets with two writing pens, all mounted on carriage with variable speed. A precision instrument for the graphic recording of any laboratory experiments requiring the measurement of small time.  
 Duty Free..... 300.00      Duty Paid..... 375.00  
 24486. Chronoscope, Hipp, with two dials, reading to  $\frac{1}{1000}$ th of a second; clock-work operates for one minute.  
 Duty Free..... 96.00      Duty Paid..... 120.00  
 24488. Chronoscope, Hipp, as above, but on wooden base with levelling screws.  
 Duty Free..... 90.00      Duty Paid..... 112.50  
 24490. Chronoscope, Hipp, large model, operating 6 minutes from one winding; on column support.  
 Duty Free..... 156.00      Duty Paid..... 195.00  
 24492. Chronoscope, Hipp, as above, but on wall bracket.  
 Duty Free..... 144.00      Duty Paid..... 180.00  
 24496. Chronoscope, Ewald, for counting rapid interruptions in electric current, such as from an electrically driven tuning fork, etc.; dial divided from 1 to 100; pointer may be set instantly to zero after each reading.  
 Duty Free..... 50.40      Duty Paid..... 63.00



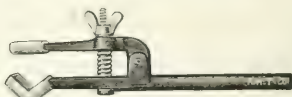
No. 2450P Small



No. 2450I Small



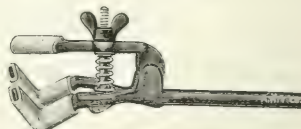
No. 24500 Large



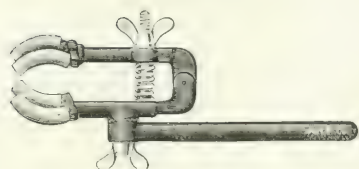
No. 2450I-Medium



No. 24508-Small



No. 2450I-Large



No. 24508-Large



No. 24514



No. 24510



No. 24518

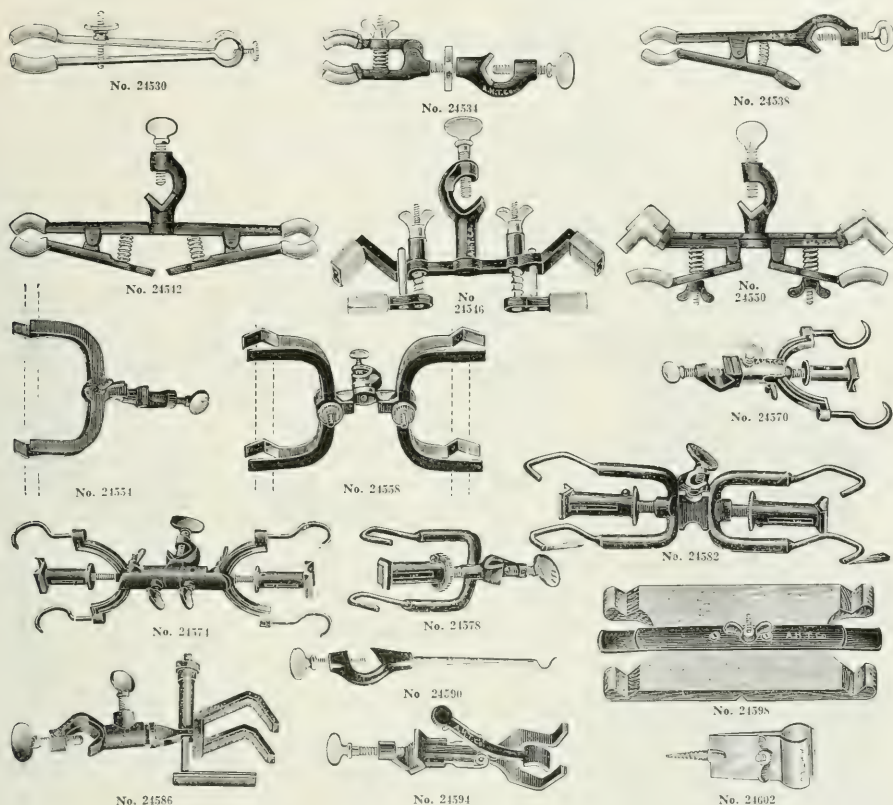


No. 24522



No. 24526

24500. Clamps, Bunsen, extension, of japanned iron, with cylindrical rubber covered jaws. For use with clamp holders No. 24518 and No. 24526.
- |   |     |     |
|---|-----|-----|
| Total length, inches.....               | 8   | 9   |
| Will take tube, inches in diameter..... | 1½  | 2   |
| Each.....                               | .40 | .60 |
24504. Clamps, Bunsen, extension, of japanned iron, with one flat and one V shaped rubber covered jaw in the small and medium sizes and two in the large size. For use with clamp holders No. 24518 and No. 24526.
- |   |     |     |     |
|---|-----|-----|-----|
| Total length, inches.....               | 7½  | 9   | 10  |
| Will take tube, inches in diameter..... | 1   | 2   | 2½  |
| Each.....                               | .40 | .60 | .75 |
24508. Clamps, Universal, extension, of japanned iron, with universal motion permitting its use for articles of irregular shape. Especially recommended for use with condensers and retorts. For use with clamp holder No. 24518.
- |   |     |      |
|---|-----|------|
| Total length, inches.....               | 8   | 11   |
| Will take tube, inches in diameter..... | 1½  | 3    |
| Each.....                               | .75 | 1.25 |
24510. Clamps, Hoffmann, extension, with one flat and one V shaped jaw, covered with rubber, the flat jaw with parallel motion. Total length 9½ inches. Will take tubes up to 1½ inches in diameter..... .40
24514. Clamps, Ostwald, extension, of polished brass. Jaws will take tubes from 1 to 50 mm in diameter. 2.00
24518. Clamp Holder, of japanned iron, with brass screws for attaching extension clamps, extension rings, etc., to apparatus supports.
- |   |     |     |
|---|-----|-----|
| For supports up to, inches in diameter..... | ¾   | ¾   |
| Each.....                                   | .20 | .25 |
24522. Clamp Holder, of polished brass throughout, for supports up to 16 mm in diameter..... 1.10
24526. Clamp Holder, same as No. 24518 but adjustable, for rods up to ½ inch in diameter..... .50

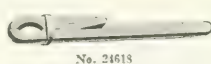


24530.	Clamp, of nickel plated brass, with rubber covered jaws.	.50
24534.	Clamp, of stamped steel, with rubber covered jaws; adjustable by check nut to any angle. A widely used and satisfactory clamp.	.40
24538.	Clamp, of japanned iron. With rubber covered jaws held together by spring.	.55
24542.	Clamp, same as No. 24538 but for two burettes.	.75
24546.	" Hoffmann, double, of japanned iron, with one V shaped and one parallel moving jaw, rubber covered.	1.00
24550.	Clamp, improved double form, with V shaped and rubber covered convex jaw.	1.00
24554.	Clamp, of brass, with widely separated jaws giving perfect support to burettes, etc.	1.25
24558.	Clamp, same as No. 24554 but double.	2.00
24570.	" of brass, adjustable so that burette may be held in vertical position no matter in what position the upright support may be fixed. Single, for one burette.	2.70
24574.	Clamp, same as No. 24570 but double, for two burettes.	4.35
24578.	" for immediate fixation of burette and permitting graduations to be freely read. Single.	1.05
24582.	Clamp, same as No. 24578 but double.	1.70
24586.	Clamp, of brass, with one parallel moving and one V shaped jaw for tubes up to 2½ inches in diameter such as condensers, etc.	2.10
24590.	Clamp, with screw for attaching to supports and brass hook for supporting apparatus.	.75
24594.	Clamp, of japanned iron, with strong spring closed, movable jaw. A heavy serviceable clamp for large burettes, etc.	.50
24598.	Clamp, Lincoln, for two burettes. Will fit any rod up to ½ inch diameter. Burettes are held perpendicular and are easily removed; very convenient and rigid.	.75
24602.	" of brass, nickel plated, for burettes. For screwing into wall or wood, so constructed that the graduated part of the burette is not covered.	.40

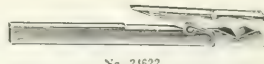




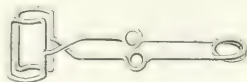
No. 24606-10 and 11



No. 24613



No. 24622



No. 24626



No. 24631



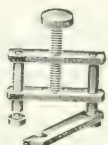
No. 24638



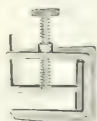
No. 24642



No. 24646



No. 24650



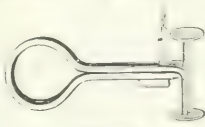
No. 24654



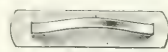
No. 24658



No. 24662



No. 24666



No. 24670



No. 24674

# 24606. Clamp, Chaddock, for holding beakers

Size.	Small	Large
For beakers, mm in diameter.	40-60	60-80
Each.	.25	.25

# 24610. Clamp, Chaddock, for holding evaporating dishes.

Size.	Small	Medium	Large
For dishes, inches in diameter.	3 to 4	4 to 6	6 to 7
Each.	.25	.25	.25

# 24614. Clamp, Chaddock, for holding test tubes and necks of flasks.

24618.	"	of wood, with rubber spring, for test tubes.	.10
24622.	"	same as No. 24618 but with wire spring.	.10
24626.	"	Stoddart, of spring brass wire, 4½ inches long, for test tubes.	.15
24630.	"	same as No. 24626 but of nickel plated steel wire.	.10
24634.	"	of nickel plated steel wire, for test tubes, improved form, 6 inches long.	.15
24638.	"	nickel plated, for holding crucibles and small dishes.	.40
24642.	"	" " German form, for test tubes.	.40

# 24646. Clamp, Hoffman, nickel plated, for rubber tubing, so-called "screw compressor." Dimensions given

Size, inches.	1	1½
Each.	.20	.25

# 24650. Clamp, Hoffman, for rubber tubing, nickel plated, with one swinging jaw.

Maximum diameter of tubing, inches.	1	1½
Each.	.25	.30

# 24654. Clamp, Hoffman, for rubber tubing, nickel plated with open jaw.

Maximum diameter of tubing, inches.	1	1½
Each.	.25	.30

# 24658. Clamp, of brass, nickel plated, for rubber tubing, extra heavy, ½ x 1½ inches.

# 24662. " Mohr's Pinchcock, of nickel plated spring wire (rectangular cross section) for rubber tubing.

Total length of clamp, inches.	1½	2	2½	3
Each.	.10	.15	.20	.25

# 24666. Clamp, Mohr's Pinchcock, for rubber tubing, same as No. 24662, but with automatic catch to hold

clasp open.				
Total length of clamp, inches.	2	2½	3	3½
Each.	.25	.30	.35	.40

# 24670. Clamp, of brass, nickel plated, for watch glasses.

For watch glasses, mm in diameter.	50	65
Each.	.15	.20

# 24674. Clamp, of malleable iron with steel screw for fastening apparatus to table.

Length, inches.	3	4	5	6
Each.	.30	.40	.50	.60



No. 24678



No. 24682



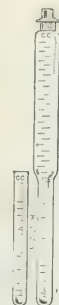
No. 24686



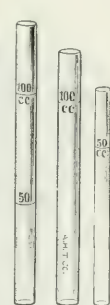
No. 24702



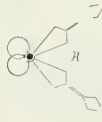
No. 24706



No. 24710



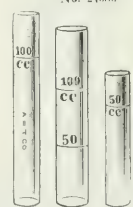
No. 24718



No. 24711



No. 24686

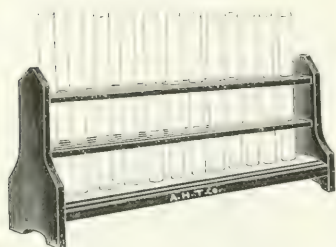


No. 24690

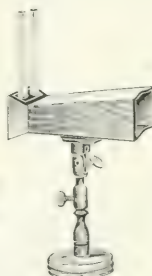
- 24678.** Clamp, for thermometers, burettes, conductivity vessels, etc. The advantage of this clamp is that the same spring which clamps the article to be held in a vertical position, i. e., thermometers, etc., serves also to clamp the support on which the clamp is used, thus obviating the use of any screws. The clamps are of spring brass, heavily nickel plated and are kept in stock to fit vertical supports of 6 mm, 8 mm and 10 mm.
- To fit support, mm..... 6 8 10
- Each..... .90 .90 .90
- 24682.** Clamp, as above, with handle, for holding test tubes, small flasks, etc..... 1.15
- 24686.** Extension Holder with clamps as above to fit 6 mm support.
- Number of clamps..... 1 2
- Each..... 1.10 2.00
- 24690.** Clock (Thayer Interval Timer), new model with bell entirely enclosed in brass case. Very convenient in timing continuous laboratory operations..... 4.75

### COLOR TESTING APPARATUS.

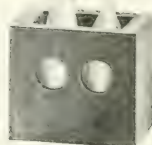
- 24702.** Color Comparison Tubes, Eggertz, for the estimation of carbon and manganese in steel by the colorimetric method.
- Capacity, cc..... 30 50
- Graduated in, cc.....  $\frac{1}{10}$   $\frac{1}{10}$
- Per set of two..... 2.50 2.75
- " " four..... 5.00 5.50
- 24706.** Color Comparison Tubes, Julian, same as No. 24702 but with bent ends. The bent end permits the mixing of the contents without the use of a stopper in the tube. The lower portion of the tube is ungraduated.
- Graduated from, cc..... 5 to 30 10 to 50
- Graduated in, cc.....  $\frac{1}{10}$   $\frac{1}{10}$
- Per set of two..... 2.75 3.00
- " " four..... 5.50 6.00
- 24710.** Color Comparison Tubes, Camp, for manganese determinations.
- Per set of two..... 6.00
- 24714.** Color Comparison Tubes, Nessler, of special colorless glass, usual form. Height of 50 cc mark in 50 cc tubes 120 mm, height of 100 cc mark in 100 cc tubes, 150 mm.
- Graduation, cc..... 50 100 50 and 100
- Each..... .50 .60 .70
- 24718.** Color Comparison Tubes, Nessler, American Public Health Association. With polished bottoms and 50 cc mark 210 mm high on 50 cc tube, and 100 cc mark 325 mm high on 100 cc tubes. Tubes in selected sets of six or twelve guaranteed to have either 50 cc or 100 cc marks within 6 mm of same height. See American Public Health Association "Standard Methods of Water Analysis," 1912.
- Graduation, cc..... 50 100 50 and 100
- Each..... .50 .75 .90
- Per set of six..... 3.15 4.75 5.70
- " " twelve..... 6.60 9.90 11.90



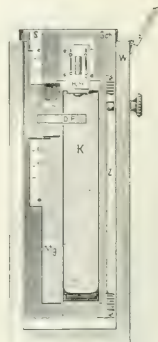
No. 24722



No. 24726



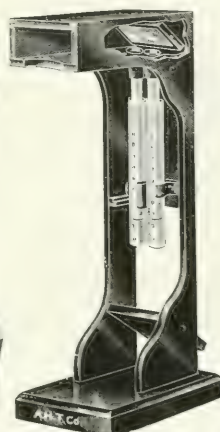
No. 24731



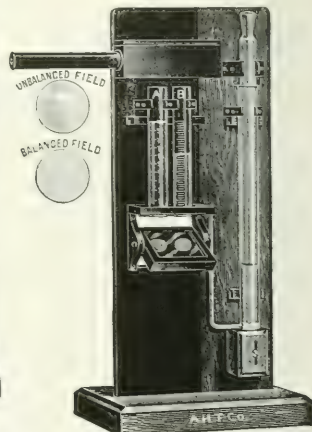
No. 24730



No. 24734

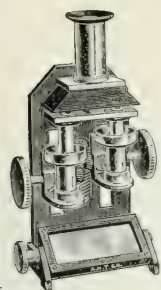


No. 24738

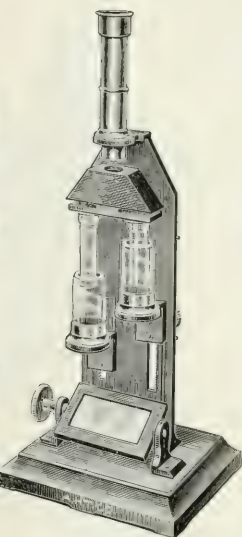


No. 24742

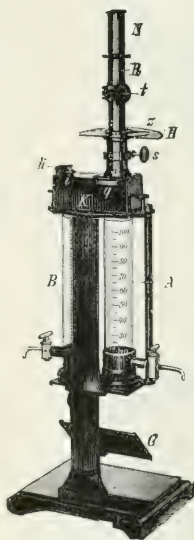
24722. Stand for Nessler Tubes No. 24718, of wood painted a dull black, with bottom lined with opal glass plate. For twelve 50 cc tubes ..... 4.50
24726. Camera, for comparing color comparison tubes such as No. 24718, etc. Improved form with blue and ground glass ..... 10.00
24730. Colorimeter, Rowntree and Geraghty, designed especially for accurately estimating the functional ability of the kidneys and for the determination of the relative efficiency of each kidney when the secretions are separately collected by the Phenolsulphonephthalein Test. In wooden case, without ampoules of Phenolsulphonephthalein ..... 20.00
24732. Sterile Ampoules of Phenolsulphonephthalein, 10 in box ..... 1.00
24734. Colorimeter, Dunning, for estimating the quantity of phenolsulphonephthalein excreted when applying the Rowntree and Geraghty Renal Functional test. Complete in polished wooden case. 5.00
24738. Colorimeter, Schreiner, as used in the U. S. Bureau of Soils. All working parts coming in contact with the sample or standard are of glass. Broken parts are easily replaceable. See *Journal of the American Chemical Society*, Sept. 9, 1905, and *Bulletin No. 31 of the U. S. Department of Agriculture, Bureau of Soils*. ..... 15.00
24739. Graduated tubes for above, per pair ..... 3.00
24740. Plain tubes for above, per pair ..... .50
24742. Colorimeter, Kennicott—Campbell-Hurley. This instrument is used in the analysis of water, determination of carbon in steel, titanium metal, etc., and for the color variations of dye stuffs. See *Journal of the American Chemical Society*, July, 1912. .... 20.00



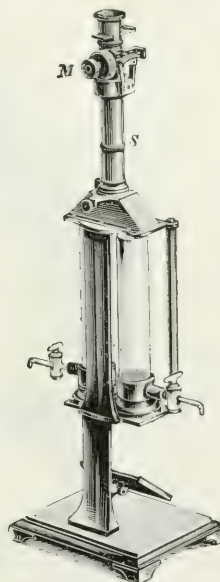
No. 24758



No. 24746



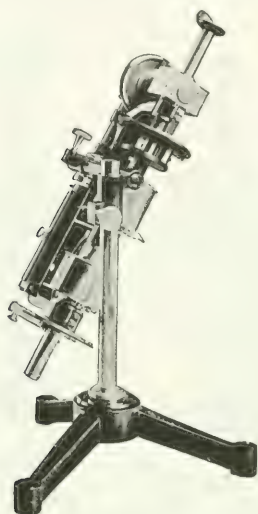
No. 24762



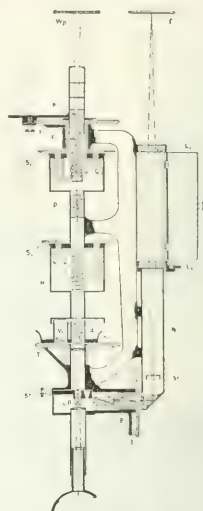
No. 24766

24746. **Colorimeter, Duboscq, original French make.** A standard instrument for a great variety of work and as used in physiological chemistry in the determination of the total nitrogen in urine, non-protein nitrogen, urea and ammonia in blood, urea in urine, etc., by the methods of Dr. Otto Folin.
- |                         |       |        |
|-------------------------|-------|--------|
| Height of tube, cm..... | 5     | 10     |
| Duty Free.....          | 56.25 | 77.50  |
| Stock.....              | 81.00 | 111.60 |
24750. **Extra Glass Tubes, for Duboscq Colorimeter.**
- |                         |      |      |
|-------------------------|------|------|
| Height of tube, cm..... | 5    | 10   |
| Each, from stock.....   | 3.00 | 4.25 |
24754. **Colorimeter, Duboscq, original French make, same as No. 24746 but with longer tubes and with horizontal reading telescope for convenience of operator.**
- |                         |        |        |        |
|-------------------------|--------|--------|--------|
| Height of tube, cm..... | 20     | 30     | 35     |
| Duty Free.....          | 100.00 | 125.00 | 137.50 |
| Duty Paid.....          | 144.00 | 180.00 | 200.00 |
24758. **Colorimeter, Duboscq, original French make, small size, for biological investigation of blood, serums, etc., where only small quantities of solution are available.** Determinations may be made with less than 1 cc of solution, as furnished by us to Harvard Medical School, Cornell University, University of Pennsylvania, etc.
- |                |       |            |       |
|----------------|-------|------------|-------|
| Duty Free..... | 37.50 | Stock..... | 54.00 |
|----------------|-------|------------|-------|
24762. **Colorimeter with Polariscope (Polarisation-Colorimeter), with Grosse prism combination.** See *Zeitschrift f. physik. Chem.* 10, 165, 1892.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 57.00 | Duty Paid..... | 76.00 |
|----------------|-------|----------------|-------|
24766. **Colorimeter with Spectroscope (Spectro-Colorimeter), Krüss with ocular slit and device for accurately measuring location in spectrum.** See *Krüss Kolorimeter S. 121 u. Zeitschrift f. Physik. Chemie* 10, 165, 1892.
- |                |       |                |        |
|----------------|-------|----------------|--------|
| Duty Free..... | 75.00 | Duty Paid..... | 100.00 |
|----------------|-------|----------------|--------|



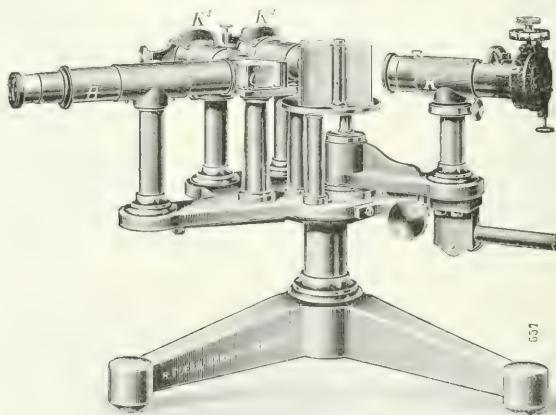


No. 24770



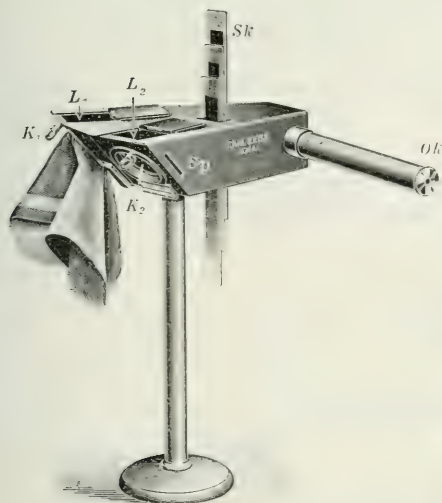
No. 24770—Sectional View

24770. Colorimeter-Chromoscope, Arons, for physiological and psychological work as well as the measurement of colors of paper, leather, yarn and other substances. See *Annalen der Physik*, Band 33, 1910 and Band 39, 1912. Reprint in German sent on application.  
Duty Free..... 420.00      Duty Paid..... 588.00

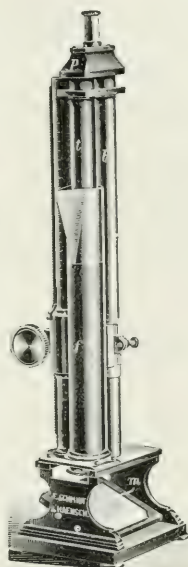


No. 24774

24774. Colorimeter, Precision, Nutting, as used in the U. S. Bureau of Standards. This Colorimeter is a monochromatic analyzer of wide range, high precision and great simplicity. The use of arbitrary reference standards, such as red, green and blue, is eliminated, the reading being given directly in wave length and per cent white. Light of a pure spectral hue may be mixed with white light to match the unknown, or, in the case of purple, mixed with the unknown to match white. The comparison is made by means of a Lummer-Brodhun prism. See *Bulletin of the Bureau of Standards*, Vol. 9, and *Zeitschrift für Instrumentenkunde* 1913, Januar.  
Duty Free..... 202.50      Duty Paid..... 270.00



No. 24778

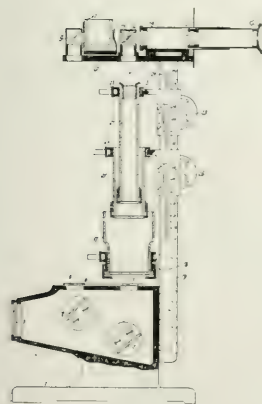


No. 24782



No. 24786

24778. Color Tester, Zeiss, with color scale, for accurate color comparisons of opaque materials, solutions, etc. See *Chemiker-Zeitung* 1912, S. 853, Bd. 36.  
Duty Free..... 50.00 Duty Paid..... 68.00
24782. Colorimeter, Stammer, designed especially for use in the sugar industry. Constructed entirely of metal, with tubes 260 mm high, and with four standard colored glasses.  
Duty Free..... 52.50 Stock..... 70.00
24786. Colorimeter, Stammer, constructed of metal throughout with tubes 350 mm high. Especially designed for use in testing petroleum and other mineral oils. Arranged for convenient determinations of market grades of oil such as Standard White, Prime White, Superfine White and Water White. With two Uranium Normal glass discs.  
Duty Free..... 78.00 Stock..... 104.00



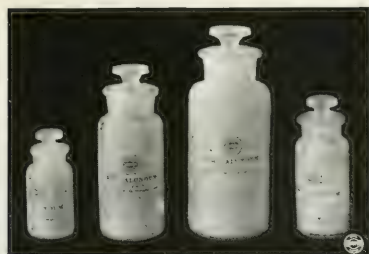
No. 24802

24790. Immersion Tube of glass, with two jars, for use with No. 24786.  
Duty Free..... 12.60  
Stock..... 17.50
24794. Uranium Glass Plates for petroleum work for normal and half normal colors.  
Duty Free, each..... 4.35  
Stock, each..... 6.00
24798. Normal Glass Plates, for beer, sugar and other work.  
Duty Free, each..... 1.10  
Stock, each..... 1.50
24802. Colorimeter (Chromophotometer) Plesch, Model I, as used in biological chemistry and described by Plesch "*Haemodynamische Studien*," Berlin, 1909, and as used in the Laboratory of Physiological Chemistry, University of Pennsylvania. With two color tubes fitting one into the other, Lummer-Brodhun prism, trough, comparison prism, etc., with horizontal telescope and camera.  
Duty Free..... 127.50  
Duty Paid..... 170.00

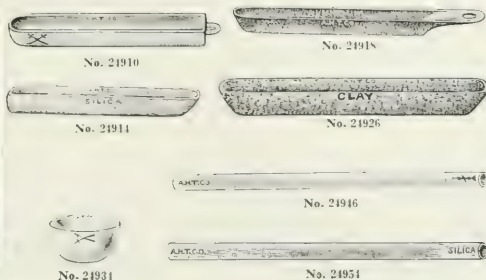
## LOVIBOND'S TINTOMETER

Note—Because of the great variety of combinations possible we do not carry these outfits in stock. Delivery can be made by importation usually in from three to five weeks. Manufacturer's original publication with full descriptive matter sent upon request.

24806.	Colorimeter (Lovibond's Tintometer) improved optical instrument for both monocular and binocular vision.				
	Duty Free.....	12.60	Duty Paid.....		16.50
24810.	Colorimeter (Lovibond's Tintometer) optical instrument, monocular only, arranged in case for factory use to prevent standards from being handled.				
	Duty Free.....	18.90	Duty Paid.....		25.20
24814.	Colorimeter (Lovibond's Tintometer) improved optical instrument with hot water attachment for liquidating solids below 212° F.				
	Duty Free.....	22.50	Duty Paid.....		30.00
24818.	Complete Set of Standard Glasses for Lovibond's Tintometer, 470 glasses in set for matching all colors.				
	Duty Free.....	282.00	Duty Paid.....		376.00
	Accessories for Lovibond Tintometer.				
24822.	Extra Shoe, to carry cells up to 6 inches.				
	Duty Free.....	2.25	Duty Paid.....		3.00
24826.	Stand for either No. 24806, 24810 or 24814.				
	Duty Free.....	3.75	Duty Paid.....		5.00
24830.	Stand, rigid, with support, to take cells up to two feet.				
	Duty Free.....	3.75	Duty Paid.....		5.00
24834.	Extra Support, making the above suitable for cells of any length.				
	Duty Free.....	2.25	Duty Paid.....		3.00
24838.	Mirror, white reflecting, for long troughs.				
	Duty Free.....	3.75	Duty Paid.....		5.00
24842.	Mirror, white reflecting, mounted on jointed brass stand.				
	Duty Free.....	9.00	Duty Paid.....		12.00
24846.	Metal Trough, with glass ends either silver plated or of brass.				
	Gauged, inches.....	$\frac{1}{8}$	1	12	24
	Duty Free.....	3.00	3.75	7.50	9.00
	Duty Paid.....	4.00	5.00	10.00	12.00
	Combination Outfits for specific purposes.				
24850.	Lovibond Tintometer Set for brewers, maltsters, sugar and caramel manufacturers, wine and spirit merchants, etc., including the improved optical instrument No. 24806 box with stand and reflector, 1 inch, and $\frac{3}{8}$ inch silvered cells, filtering apparatus and 20 standard glasses, series 52 and 50; as recommended by the Council of the Institute of Brewing in their Malt Analysis Report "Colored Malts and Caramel."				
	Duty Free.....	37.50	Duty Paid.....		50.00
24851.	Extra Apparatus for estimating the color of dry malt, consisting of 33 standard glasses, with trays, presser and standard white.				
	Duty Free.....	17.40	Duty Paid.....		23.20
24858.	Lovibond Tintometer Set for estimating the color in water, including the monocular optical instrument No. 24810, box with supports and reflector, 2 ft. and 1 ft. brass cells and forty standard glasses.				
	Duty Free.....	63.60	Duty Paid.....		84.80
24862.	Lovibond Tintometer Set for estimating percentage of Ammonia in Nessler's Ammonia Test, including the improved optical instrument, No. 24806, box with stand and reflector, $\frac{1}{2}$ inch glass cell, with 30 standard glasses.				
	Duty Free.....	36.00	Duty Paid.....		48.00
24866.	Lovibond Tintometer Set for estimating Carbon in Steel, including the improved optical instrument No. 24806, box stand and reflector, $\frac{1}{2}$ inch cell and 34 standard glasses series 52, and 26 glasses series 50.				
	Duty Free.....	48.00	Duty Paid.....		64.00
24870.	Lovibond Tintometer Set for estimating the color in oils, waxes, lards and other fats, varnishes, gelatine, scale, etc., including the improved optical instrument fitted with hot water attachment for melting solids. No. 24814, thermometer for taking their melting point, box, 1 inch. $\frac{1}{2}$ inch and $\frac{1}{4}$ inch silvered cells, without standard glasses.				
	Duty Free.....	40.50	Duty Paid.....		54.00
24874.	Lovibond Tintometer Set, simple form, for estimating color in cotton seed oil, fitted with standard oil bottle and compound glass and set of 24 standard cotton seed oil glasses.				
	Duty Free.....	20.40	Duty Paid.....		27.20
24878.	Lovibond Tintometer Set, for estimating the color in cotton seed oil, including the improved optical instrument No. 24814 fitted with lamp and hot water attachment for liquifying the oil and maintaining a given temperature, $\frac{5}{8}$ inch cell and 36 standard glasses.				
	Duty Free.....	57.00	Duty Paid.....		76.00
24882.	Lovibond Tintometer Set for standardizing merchantable petroleum, including the monocular optical instrument No. 24806, box with stand and reflector, 18 inch silvered cell, 4 special standard glasses for water white, standard white, superfine white and prime white.				
	Duty Free.....	33.00	Duty Paid.....		44.00
24886.	Extra Apparatus for Intermediate, Russian and Lubricating oils, containing $\frac{1}{8}$ inch silvered cell and 5 additional standards.				
	Duty Free.....	9.60	Duty Paid.....		12.80
24890.	Lovibond Tintometer Set for estimating the value of flour, including the improved optical instrument No. 25806, standard white, 6 trays, pressing apparatus and 90 standard glasses.				
	Duty Free.....	63.00	Duty Paid.....		84.00
24894.	Lovibond Tintometer Set for estimating the coloring matter in tanning solutions, consisting of binocular instrument in polished box, with stand and reflector, 5 cm and 10 cm glass cells and 88 standard glasses.				
	Duty Free.....	64.50	Duty Paid.....		86.00

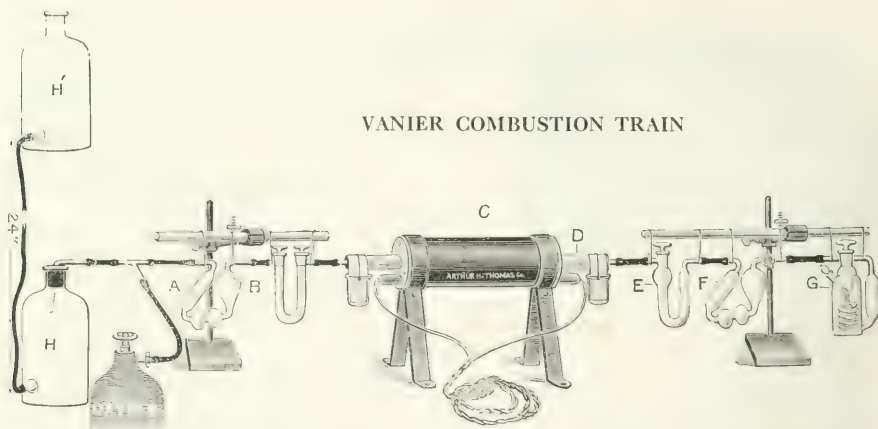


No. 24930



24910.	Combustion Boats, Royal Meissen Porcelain.					
	Length, mm.....	60	75	75	100	115
	Width, mm.....	10	11	15	18	13
	Each.....	.15	.15	.15	.25	.25
24914.	Combustion Boats, Opaque Silica, glazed, without handle.					
	Length, inches.....	1 3/4		3	3	4
	Width, inches.....	3/4		3/4	3/4	3/4
	Each.....	.50		.75	.90	1.15
24918.	Combustion Boats, Alundum, adaptable to a great variety of work, but particularly designed for the determination of carbon in iron and steel. The boats may be used repeatedly because the alundum does not react with the iron oxide in the sample. Shapes have been carefully designed by practical chemists.					
	Length, inches.....	3 1/2	3 3/4	4 7/8	5	5 1/2
	Width, inches.....	3/4	3/4	3/4	3/4	3/4
	Depth, inches.....	3/8	3/8	3/8	3/8	3/8
	Each.....	.30	.35	.50	.40	.40
24922.	Alundum Cover for Combustion Boat No. 24918, 4 7/8 inches long x 3/8 inch wide.....					.75
24926.	Combustion Boats, Johnson, of clay.....					.10
24930.	R R Alundum, for use with combustion boats of either platinum or siliceous materials and particularly recommended for alundum boats, increasing their durability and preventing their destruction during combustions. Consists of pure crystalline Alumina and is supplied in granular form of No. 60, 90 and 120 mesh for use in the determination of carbon in steel. Please specify mesh in ordering. In glass stoppered bottles.					
	Size bottle.....			1/2 lb.	1 lb.	2 lbs.
	Each.....			.40	.75	1.50
24934.	Combustion Capsules, Royal Meissen Porcelain, without lip, as used in coal analysis.					
	Diameter, mm.....				40	50
	Depth, mm.....				22	30
	Each.....				.20	.20
24938.	Combustion Tubes, Alundum, to withstand temperatures of approximately 2000° C. These tubes are made gas-tight by glazing without sacrificing their refractive quality; in 24 inch lengths.					
	Inside diameter, inches.....	3/8	3/4	1		
	Each.....	4.95	4.95	4.95		
24942.	Combustion Tubes, Sanitäts Porcelain. Glazed inside and outside. In 60 cm lengths.					
	Inside diameter, mm.....	15	18	22	25	
	Each.....	1.60	2.00	2.25	2.75	
24946.	Combustion Tubes, Royal Berlin Porcelain, glazed inside and outside. Will stand a temperature of 1100° C. and are paractically gas tight. In 60 cm lengths.					
	Inside diameter, mm.....	15	20	28		
	Each.....	4.50	5.40	7.20		
24950.	Combustion Tubes, Marquard Mass, for temperatures up to 1650° C. These are furnished either glazed or unglazed. In 60 cm lengths.					
	Inside diameter, mm.....		15	20		
	Each.....		4.00	4.75		
24954.	Combustion Tubes Opaque Silica, for temperatures up to 1500° C. Tubes of the following diameters are carried in stock in 2 ft. lengths but tubing from 1/2 in. to 2 in. inside diameter can be furnished in lengths up to 8 ft.; 24 in. long x 3/8 in. inside diameter is the standard tube for Hoskins Combustion Furnace No. 2898S					
	Inside diameter, inches.....	3/8	7/8	1		
	Each, unglazed.....	4.20	4.60	5.00		
	Each, glazed on outside and at one end.....	5.20	5.60	6.00		
24956.	Combustion Tube, Vitrified Clay, Johnson. When used with tapered clay connector below rubber stoppers are unnecessary in carbon combustion work, etc. See <i>Journal of Industrial &amp; Engineering Chemistry</i> , July, 1913.....					3.00
24957.	Tapered Connector, Vitrified Clay, for use with above.....					.90





No. 24958

**COMBUSTION TRAIN, VANIER, for the Determination of Carbon in Steel by the Direct Combustion Method with Electric Furnace, consisting of the following:**

- H and H', 4 liter Aspirator Bottles for maintaining a constant pressure, H being filled with water.  
A, Potash Bulb with caustic potash for purifying oxygen before entering tube.  
B, Calcium Chloride Tube, for removing moisture from oxygen before entering tube.  
C, Hoskin Electric Combustion Tube Furnace.  
D, Glazed Quartz Combustion Tube,  $\frac{3}{4}$  inch bore and 2 feet long.  
E, Vanier Zinc Tube for granulated zinc, to remove any trace of sulphur.  
F, Vanier Sulphuric Acid Bulb, for absorbing moisture.  
G, Vanier Combined Potash Bulb and Drying Tube.

The determination of carbon in steel is one of the principal duties of the Steel Chemist and when this analysis is made by the direct combustion method with the proper furnace and absorption train, it becomes one of the most satisfactory analyses, both in point of time and in accuracy to be made in a steel laboratory. This combustion outfit is the design of Mr. Geo. P. Vanier, Chief Chemist of the Pennsylvania Steel Company, several of the important components of the train being specially designed by Mr. Vanier for this apparatus. With this outfit one man can, with five outfits, maintain a rate of ten combustions per hour. An important feature of the outfit is the Vanier Combined Potash Bulb and Drying Tube (Patented) Fig. G of the illustration. It offers many advantages over the bulbs formerly used, i.e.—

Large capacity. Six grams, or more, of carbonic acid can be absorbed, thus enabling the chemist to make over 100 combustions without refilling.

No rubber caps are necessary when weighing with the bulb filled with oxygen as the glass stopcock closes the inlet and outlet.

Having a drying tube attached they are compact and more easily handled than the ordinary bulbs.

They have a smooth outer surface which is easily cleaned.

They are self-supporting and, having a firm base, can be conveniently placed on the balance pan when weighing.

The drying tube being vertical, the moist gases pass in at the bottom and the drying tube never stops up. As the solid caustic potash deliquesces it forms a pool in the bottom of the drying tube thus making an extra seal.

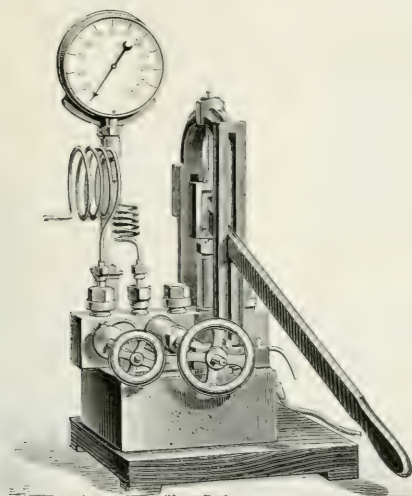
The gases can be passed at a high rate without loss of  $\text{CO}_2$  or moisture.

When gases are passed through rapidly the action is perfectly quiet without any spraying or jumping of the solution.

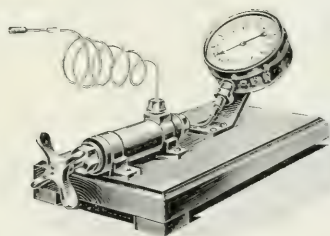
24958. Vanier Combustion Train, complete outfit as illustrated, consisting of aspirator bottles H and H'; bulbs A, B, E, F and G, Hoskin Electric Combustion Furnace C, glazed quartz combustion tube D rubber tubing, supports, clamps, glass rods, two Aluminum combustion boats,  $3\frac{1}{4} \times \frac{3}{8}$  inches, and  $\frac{1}{2}$  lb. of R R Aluminum but without oxygen tank. 42.00  
24962. Vanier Combustion Train, complete as above, but with the addition of Hoskins Rheostat for regulating temperature of furnace. 50.00

#### Single Parts.

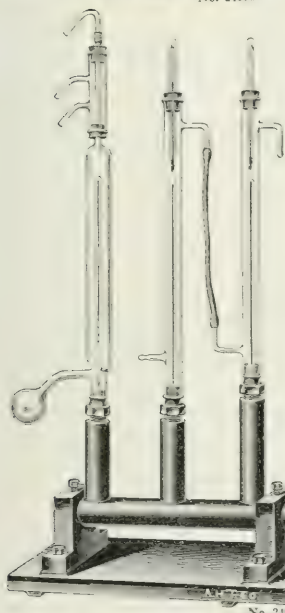
44732.	Potash Bulb. A of illustration.	.50
23252.	Calcium Chloride Tube. B of illustration.	.90
28988.	Hoskin Electric Combustion Tube Furnace. C of illustration.	25.00
24954.	Glazed Quartz Combustion Tube, $\frac{3}{4}$ in. bore x 2 ft. long. D of illustration.	5.20
26656.	Vanier Zinc Tube. E of illustration.	.75
26660.	Vanier Sulphuric Acid Bulb. F of illustration.	1.25
26664.	Vanier Combined Potash Bulb and Drying Tube. G of illustration.	3.25
24918.	Aluminum Combustion Boats. $3\frac{1}{4}$ in. x $\frac{3}{8}$ in., each.	.35
24930.	RR Aluminum. In 1 lb. glass stoppered bottle.	.75
24964.	Factor Weight, 2.7273 grams, of lacquered brass. For weighing charge of boat.	.75



No. 24970



No. 24978



No. 24982

24970. **Compression Pump**, hand, for laboratory use in the compression of either liquids or gases.

For pressures up to, atmospheres ... 300 1000

Duty Free..... 136.40 156.20

Duty Paid..... 173.60 200.00

24974. **Reservoir** for the above, on stand for the Cailletet experiment in the liquefaction of gases.

For pressures up to, atmospheres.... 300 1000

Duty Free..... 39.60 50.60

Duty Paid..... 50.40 64.40

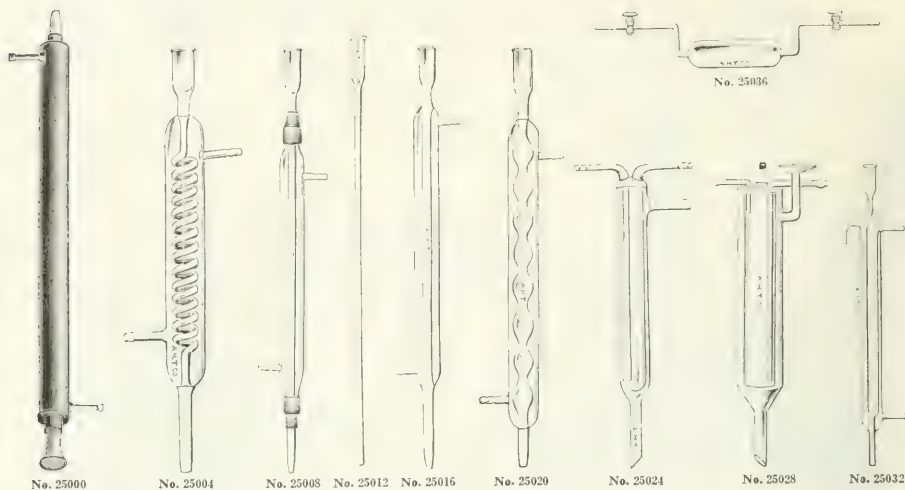
**Note:**—Compressors for liquefying Air and Hydrogen of large Capacity are listed under Liquid Air Apparatus, page 285.

24978. **Compression Pump for the Determination of Critical Pressure**, with high pressure manometer mounted on board, with six extra capillaries. See *Phys.-chem. Mess. Seite 228*.

Duty Free..... 43.60 Duty Paid..... 59.40

24982. **Compression Pump, Ramsay-Young**, for gases, consisting of an iron compression cylinder with screw for pressure up to 200 atmospheres, with three tubulations for manometers, three calibrated and graduated manometer tubes of English lead glass, two cooling jackets with thermometers, etc. See *Travers, experimentelle Untersuchung von Gasen pag. 251 Braunschweig 1905*.

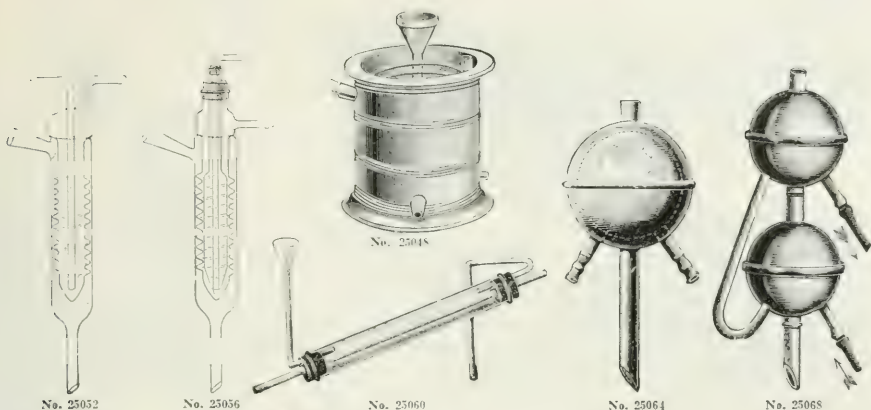
Duty Free..... 90.75 Duty Paid..... 123.75



25000.	Condenser, of brass, with condensing tube of glass. With rubber stoppers.							
	Length, mm.....	300	375	500	600	675	750	1000
	Each.....	3.00	3.50	3.80	4.20	4.50	5.00	6.50
25004.	Condenser, Liebig, of glass, with condensing tube in form of coil sealed in water jacket.							
	Length, mm.....	150	200	250	300	400	600	
	Each.....	1.25	1.60	1.80	2.25	3.00	5.00	
25008.	Condenser, Liebig, with rubber connections.							
	Length, mm.....	250	300	400	500	600	800	1000
	Each.....	.85	1.00	1.10	1.25	1.60	2.00	3.00
25012.	Condenser Tubes for above condensers, of glass.							
	Length, mm.....	250	300	400	500	600	800	1000
	Each.....	.18	.20	.22	.25	.35	.45	.65
25016.	Condenser, Liebig, of glass, with inner tube sealed to body.							
	Length, mm.....	250	300	400	500	600	800	1000
	Each.....	.90	1.10	1.25	1.65	2.00		
25020.	Condenser, Allihn, of glass, with bulb condensing tube.							
	Length, mm.....	200	250	300	400	600		
	Each.....	1.10	1.25	1.40	1.60	2.40		
25024.	Condenser, Hopkins, outside jacket 35 cm long. As widely used in Extraction Apparatus. See <i>Journal of the American Chemical Society, December, 1903.</i>							1.75
25028.	Condenser, Hopkins, Picard-Law modification, which consists in the side tube being bent upright at right angles with a funnel top so that extraction fluid may be poured into the condenser without disconnecting the extraction tube when used in connection with extraction apparatus. Widely used in cotton seed oil work.							1.90
25032.	Condenser, Gökkel, may be connected air-tight with receiver and used either as a reflux condenser or for the determination of inflammable substances where dangerous gases must be led off from inside.							
	Length of jacket, inches.....					18	24	
	Each.....					3.00	3.60	
25036.	Condenser, Sulphurous Acid, Liebig, of glass, with two stopcocks on horizontal tubes.							2.25



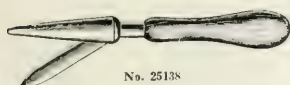
25040.	Condenser, of glass, with spiral.			
	Capacity, cc.....	500	1000	2000
	Each.....	3.00	3.50	4.25
25044.	Tripod, of metal, for use with condenser No. 25040.			
	For condenser, cc.....	500	1000	2000
	Each.....	1.00	1.50	2.00



25048. Condenser, of zinc, with heavy block tin worm. For use with distilling apparatus such as No. 26548.  
For still of capacity, gallons.....
- |           | 1    | 2    | 3    | 5     |
|-----------|------|------|------|-------|
| Each..... | 5.00 | 6.00 | 8.00 | 10.00 |
25052. Condenser, Friedrichs, of glass, screw shape, with glass screw inside. See *Zeitschrift für angew. Chemie*, 1910..... 3.00
25056. Condenser, Friedrichs, of glass, screw shape, with counter current device. Specially adaptable for use as reflux condenser. See *Zeitschrift für angew. Chemie*, 1913..... 5.00
25060. Condenser, Mohr, of glass, with cork stoppers and tubing as shown in illustration.  
Length, mm.....
- |           | 300  | 360  | 500  |
|-----------|------|------|------|
| Each..... | 1.00 | 1.25 | 1.40 |
25064. Condenser, Soxhlet, spherical, of copper tinned inside, 4 inches in diameter..... 3.00
25068. " " same as No. 25064 but with two bulbs..... 6.00
25072. Condenser Support, consisting of Support No. 37663, with extra large rectangular base, large clamp holder No. 24516 and large universal clamp No. 24508..... 2.60
25076. Condenser Support, consisting of No. 37663 with extra large rectangular base and brass condenser clamp No. 24586..... 3.00
25080. Condenser Support, for condenser up to 60 mm in diameter, with double clamp of brass, on iron tripod..... 6.00
25084. Condenser Support, for condenser up to 60 mm in diameter, of iron, with double brass clamp..... 6.00







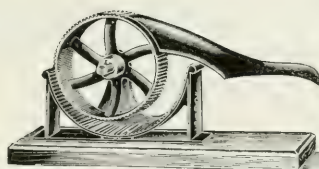
No. 25138



No. 25162



No. 25146



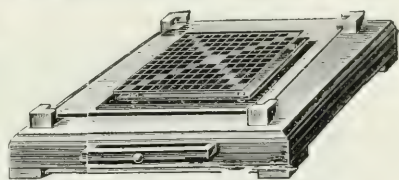
No. 25150



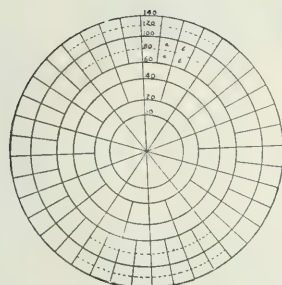
No. 25154



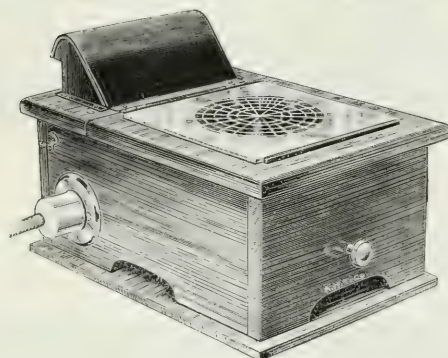
No. 25158



No. 25178



No. 25182



No. 25166



No. 25142

25138.	Cork Borer Sharpener, a steel cone with knife.	1.00
25142.	" Extractor, folding. Extractor is pushed down between neck of bottle and cork and then rotated and cork withdrawn. Very practical.	.15
25146.	Cork Press, Lever, of cast iron. Size.....	Small Large
	Each.....	.25 .40
25150.	Cork Press, Rotary. For corks up to, mm.....	18 32
	Each.....	.50 .75
25154.	Cork Screw, quick acting, in heavy wooden handle.....	.25
25158.	" self pulling, with wire cutter. The most simple and practical cork screw made.....	.50
25162.	Cork Tongs, for compressing corks by hand.....	.75
25166.	Counting Apparatus, Stewart, for colonies of bacteria, consisting of a hard wood box 12 x 6 x 8 inches, which contains a 16 candle-power incandescent lamp and adjustable platform carrying a Petri dish which is illuminated by oblique rays from the lamp which do not enter directly into the eye of the operator. A ruled glass plate is provided on the top of the box and the counting accomplished by viewing the colonies in the Petri dish through the glass plate. See <i>Journal of Medical Research</i> , January, 1906.....	12.00
25170.	Reading Lens, for use with same.....	1.50
25174.	Ruled Counting Plate, only.....	6.00
25178.	Counting Apparatus, Wolfhugel, for colonies of bacteria. Complete on wooden base with ruled glass plate and black and white back-grounds.....	5.00
25180.	Ruled Glass Plate, only.....	1.50
25182.	Counting Plate, Jeffer, for colonies of bacteria. See <i>Journal of Applied Microscopy and Laboratory Methods</i> , Vol. I, No. 3. Can be used interchangeably with the Wolfhugel's plate on the same base.....	2.00



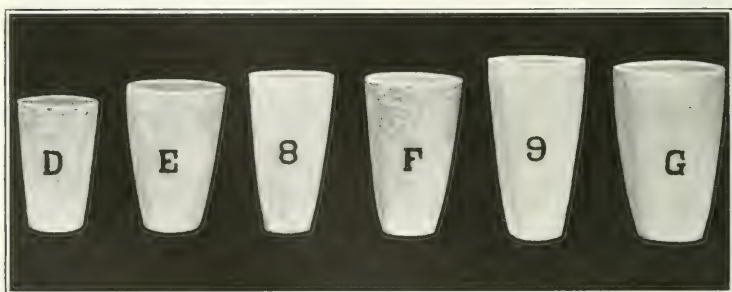
No. 25186

25186. Counting Apparatus, Böttcher, with moist chamber, consisting of an ordinary micro slide with glass ring 20 mm in diameter and 8 mm high cemented thereon. Cover glass for same ruled into 100 squares of 2 mm each, 19 of which squares are numbered..... 1.50



No. 25202

25202. Crucibles, Denver Fire Clay made in both hard and soft burn, without covers.
- |  |      |      |      |      |      |
|--|------|------|------|------|------|
| Capacity, grams.....                   | 5    | 10   | 15   | 20   | 30   |
| Approx. number in original barrel..... | 900  | 550  | 400  | 350  | 300  |
| Per dozen.....                         | .40  | .50  | .55  | .60  | 1.00 |
| Per 100 in original barrel.....        | 3.00 | 3.90 | 4.00 | 4.50 | 7.00 |
| 25206. Covers, per dozen.....          | .40  | .40  | .40  | .40  | .40  |



No. 25210

25210. Crucibles, Denver Fire Clay without covers.
- |                                   |      |      |      |      |       |       |       |
|-----------------------------------|------|------|------|------|-------|-------|-------|
| Number.....                       | D    | E    | F    | G    | J     | K     | L     |
| Height, inches.....               | 4    | 4½   | 5    | 5½   | 6½    | 7½    | 8     |
| Diameter, inches.....             | 2½   | 3    | 3½   | 3¾   | 4½    | 4¾    | 5½    |
| Approx. number in original barrel | 500  | 350  | 300  | 200  | 150   | 75    | 50    |
| Per dozen.....                    | .50  | .75  | 1.00 | 1.10 | 1.80  | 2.20  | 3.60  |
| Per 100 in original barrel.....   | 3.50 | 5.50 | 7.00 | 8.00 | 12.00 | 15.50 | 27.00 |
| 25214. Covers, per dozen.....     | .35  | .50  | .55  | .60  | .80   | 1.20  | 1.40  |



No. 25218


TRADE MARK  
No. 25222

TRADE MARK  
No. 25230


No. 25238



No. 25242



No. 25246

## 25218. Crucibles, Hessian Sand, triangular form.

	Three	Small 5s	Centimeters	Large 5s	Eights	Sizes
Number in nest.....	3	3	3	5	5	6
Height of largest, inches.....	3	4	4½	4½	7½	5½
Width at top, inches.....	2½	3	3½	3½	5½	4½
Per nest.....	.10	.10	.10	.10	.30	.20

## 25222. Crucibles, Battersea, round form. Dimensions given are outside dimensions. Without covers.

	A	B	C	D	E	F	G	H	J
Number.....	28	3	3½	4	4½	5	5½	5½	6½
Height, inches.....	2½	3	3½	4	4½	5	5½	5½	6½
Diameter, inches.....	1½	1½	2½	2½	2½	3	3½	3½	4½
Number in original barrel.....	1000	1000	750	500	500	500	400	300	250
Per dozen.....	.30	.35	.40	.45	.70	.80	1.10	1.20	1.65
Per 100 in original barrel.....	1.85	2.25	3.25	3.60	5.75	6.25	8.60	9.00	13.00

## 25226. Covers, per dozen.....

	.30	.30	.30	.35	.45	.55	.70	.80	.85
--	-----	-----	-----	-----	-----	-----	-----	-----	-----

## 25222. Crucible, Battersea, Continued.

	K	L	M	N	O	P	Q	R
Number.....	7½	8	8½	9½	10	11	12	13
Height, inches.....	4½	5½	5½	6½	7	7½	8½	9½
Diameter, inches.....	150	100	100	75	50	40	30	25
Per dozen.....	1.75	3.00	3.50	4.90	7.25	8.00	9.15	12.00
Per 100 in original barrel.....	13.50	24.00	28.00	39.00	58.00	64.00	73.00	100.00

## 25226. Covers, per dozen.....

	1.10	1.20	1.35	1.60	1.90	2.10	2.25	2.70
--	------	------	------	------	------	------	------	------

## 25230. Crucibles, Battersea, triangular form; without covers.

	S	T	U	V	W
Number.....	4½	4	3½	3½	2½
Height, inches.....	4½	3½	3½	2½	2½
Diameter, inches.....	1.15	.85	.60	.45	.40
Per dozen.....	8.75	6.50	4.75	3.60	3.00
Per 100 in original barrel.....	.85	.85	.70	.50	.50

## 25234. Covers, per dozen.....

	.85	.85	.70	.50	.50
--	-----	-----	-----	-----	-----

## 25238. Crucibles, Alundum, highly refractory; well adapted to experimental electric furnace work and used successfully for melting platinum. They are not, however, adapted for uses where slags are encountered on account of their absorbent nature.

	5144	6608	6820	5922	5923
Number.....	3	2½	2½	1½	1½
Diameter, inches.....	3½	4½	2½	2	3½
Height, inches.....	1.25	2.00	1.00	.75	1.50

## 25242. Crucibles, Opaque Fused Silica, for melting.

	1	3	4	6	7	14	16	30	60	70
Number.....	3½	4½	4	6½	7½	7½	8½	10½	12½	20
Height, inches.....	2½	3½	4½	4½	4½	5½	6½	7½	10½	12
Diameter at top, inches.....	2.00	2.15	2.15	3.15	3.75	4.00	5.00	8.00	12.50	18.00

## 25246. Crucibles, Dixon's Plumbago. Capacities given are actual total, not working capacities. The working capacity is variable, and may be from 70% to 90% of those given. The total capacity in pounds of metal depends on the specific gravity, and may be found approximately by multiplying the total liquid capacity in pints by the specific gravity of the metal.

	0	00	000	0000	1	2	3
Number.....	2	2½	2½	3	3½	4½	5½
Capacity, pints.....	1½	1½	2	2½	3½	4½	4½
Height, inches.....	.20	.20	.20	.25	.30	.35	.40
Diameter at top, inches.....	4	5	6	7	8	9	10
Number.....	1½	1½	2½	2½	3	3½	4
Capacity, pints.....	5½	6	6½	6½	7½	7½	7½
Height, inches.....	4½	4½	5½	5½	5½	6	6½
Diameter at top, inches.....	.45	.55	.60	.65	.70	.75	.80

## 25250. Covers, Dixon's Plumbago, only, for crucibles No. 25246.

	0	00	000	0000	1	2	3
To fit No.....	.15	.15	.15	.15	.15	.15	.15
Each.....	4	5	6	7	8	9	10
To fit No.....	.15	.15	.20	.25	.20	.20	.20



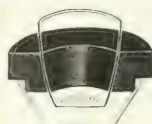




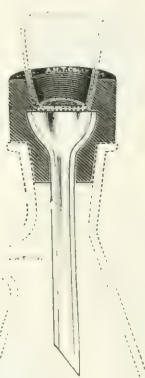
25300.	Crucible, Gooch, Sanitäts Porcelain, with perforated bottom, glazed throughout; 38 mm diameter of top by 40 mm high, diameter of bottom 25 mm. Without cover.	.40
25302.	Crucible, Caldwell, Royal Meissen Porcelain, with removable perforated bottom. Glazed throughout. Removable bottom glazed on upper surface only. Height 40 mm, diameter at top 40 mm, diameter at bottom 25 mm.	.50
25303.	Loose perforated bottom only, for above crucible.	.20
25304.	Crucible, Rose, Porcelain, with perforated cover and delivery tube. Unglazed.	
	Capacity, cc.....	15 30 60
	Each.....	.50 .80 .90
25306.	Crucible, Plattner, Royal Meissen Porcelain, glazed throughout, with wide flaring lip; height 25 mm, diameter 45 mm.	.25
20356.	Crucible, Royal Berlin Porcelain, of special shape, with large filtering surface, as used in the determination of soluble bitumen; height 24 mm, width at top 45 mm, width at bottom 35 mm.	.50
25310.	Crucible, Caldwell, Opaque Fused Silica, with open bottom with flange to take porcelain or platinum disc; 45 mm diameter at top, 25 mm diameter at bottom and 45 mm high, without disc. 1.80	
25312.	Crucibles, Iron, spun from sheet, with covers.	
	Capacity, cc.....	20 50 100 200 400
	Diameter, inches.....	1½ 2½ 2½ 3½ 3½
	Height, inches.....	1½ 1½ 2 2½ 3
	Each.....	.20 .25 .30 .40 .50
25314.	Crucibles, Copper, spun from sheet, with covers.	
	Capacity, cc.....	20 30 50 75 100 150 200 250 500
	Diameter, inches.....	1½ 1½ 1½ 2 2½ 2½ 3 3½ 4
	Height, inches.....	1½ 1½ 2 2½ 2½ 3½ 3½ 3½ 3½
	Each.....	.50 .60 .70 .80 .90 1.10 1.30 1.50 2.00
25316.	Crucibles, Pure Silver, with covers.	
	Capacity, cc.....	20 30 50 75 100 150
	Approximate weight, grams.....	35 45 60 80 100 150
	Each.....	3.25 3.75 5.25 7.00 8.50 12.00
25318.	Crucible, Nickel, Pennock-Martin, 40 cc capacity. For the rapid determination of sulphur in coal and coke. See <i>Journal of the American Chemical Society</i> , December, 1903.	
	Complete on stand.....	3.00
25320.	Crucibles, Pure Nickel. These are very superior to the ordinary article in which the manganese content frequently causes trouble. The shape is also special, being that approved in steel laboratory practice. With covers.	
	Diameter, mm.....	35 40 45 50 55 60 80 100
	Actual capacity, cc.....	23 36 50 74 93 130 300 540
	Each.....	.60 .70 .80 1.00 1.15 1.25 2.00 3.00
25322.	Crucible, Kawin, Pure Nickel, heavy wall, as used in muffle furnaces for burning off filter paper in silicon determinations in iron; 28 mm in diameter by 15 mm high.	.50
25324.	Crucible, Gooch, Pure Nickel, with perforated bottom and extra removable cup; 30 cc capacity, 1½ inches in diameter by 1½ inches high.	1.25



No. 25326



No. 25346



No. 25350



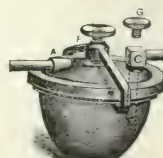
No. 25330



No. 25348

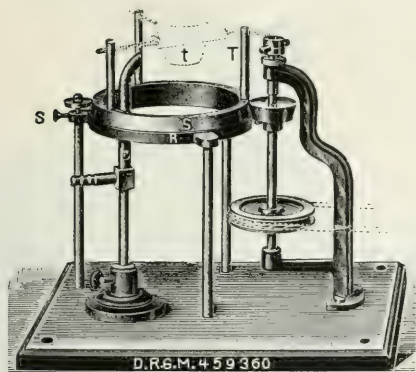


No. 25334

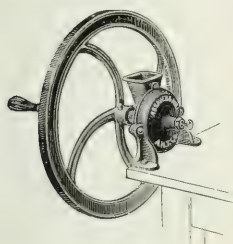
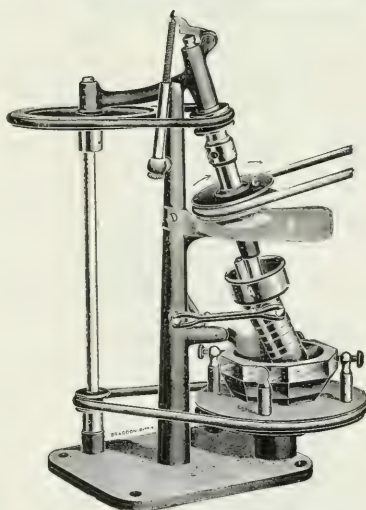
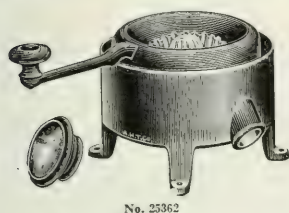
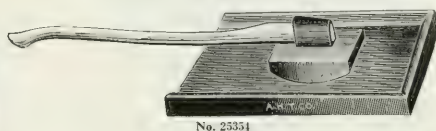


No. 25342

- 25326. Crucibles, Alumund, for general laboratory use.** These crucibles are of a very light colored mixture of which the factory number is RA 84, which number is stamped on each crucible. Without covers.
- |                       |     |     |     |
|-----------------------|-----|-----|-----|
| Diameter, inches..... | 1½  | 1½  | 1½  |
| Height, inches.....   | 1½  | 1½  | 1½  |
| Capacity, cc.....     | 20  | 40  | 25  |
| Each.....             | .30 | .35 | .35 |
- 25328. Covers, only, for crucibles No. 25326.**
- |                    |      |      |
|--------------------|------|------|
| To fit Number..... | 5202 | 5203 |
| Each.....          | .30  | .35  |
- 25330. Crucibles, Filtering, Alumund.** These crucibles are made in three degrees of porosity of which the factory designations are RA 98 very porous, RA 360 medium porous and RA 84 slightly porous. The varying degrees of porosity are easily discernible by their color and the mixture number is stamped on each crucible. Please state porosity in ordering. Without covers.
- |                       |     |     |     |
|-----------------------|-----|-----|-----|
| Diameter, inches..... | 1½  | 1½  | 1½  |
| Height, inches.....   | 1½  | 1½  | 1½  |
| Capacity, cc.....     | 25  | 35  | 35  |
| Each.....             | .30 | .35 | .35 |
- 25332. Crucible, Alumund, specially made for determining moisture in samples of coal.** 2 inches in diameter, 1½ inches high.
- 25334. Crucibles, Opaque, Fused Silica, highly glazed; low, wide shape, without covers.**
- |                       |     |     |     |      |
|-----------------------|-----|-----|-----|------|
| Height, inches.....   | 1½  | 1½  | 1½  | 1½   |
| Diameter, inches..... | 1½  | 1½  | 1½  | 1½   |
| Each.....             | .60 | .60 | .75 | 1.25 |
- 25336. Crucibles, Opaque, Fused Silica, highly glazed, high form, without covers.**
- |                       |      |      |      |
|-----------------------|------|------|------|
| Height, inches.....   | 2    | 1½   | 1½   |
| Diameter, inches..... | 2    | 1½   | 1½   |
| Each.....             | 1.25 | 1.25 | 1.25 |
- 25338. Covers, only, for crucibles No. 25334 and 25336.**
- |                              |     |     |     |     |     |
|------------------------------|-----|-----|-----|-----|-----|
| Inside diameter, inches..... | 1½  | 1½  | 2   | 2½  | 2½  |
| Each.....                    | .50 | .50 | .60 | .75 | .90 |
- 25340. Crucible, Opaque Fused Silica, highly glazed, special large size, 73 mm diameter and 8 mm high.** 2.50
- 25342. Crucible, Iron, Skidmore.** Designed for making oxygen from MnO<sub>2</sub>, calcination of chalk with recovery of the expelled CO<sub>2</sub>, manufacture of soda from cryolite, preparation of ammonia, destructive distillation of coal, wood or other organic substances, or for any use in which the materials employed or evolved do not act destructively on hot iron.
- |                       |      |      |
|-----------------------|------|------|
| Capacity, ounces..... | ½    | 6    |
| Each.....             | 1.25 | 2.00 |
- 25346. Crucible Holder, Bailey,** consisting of a rubber holder taking a 25 cc porcelain Gooch crucible. The rubber holder fits an ordinary 2 inch 60° glass funnel as shown in illustration. The lower part of the rubber holder rests against the side of the funnel supporting the crucible while the upper part makes a seal against the top of the funnel when suction is applied. Rubber holder only .30
- 25348. Crucible Holder, Spencer,** consisting of a special glass funnel or filter tube, with projecting lug to support crucible and rubber ring for use with Alumund crucible. The suction makes tight contact between the crucible and the inside of the glass funnel. See *Journal of Industrial and Engineering Chemistry*, Vol. 4, No. 8, Sept., 1912..... 1.50
- 25350. Crucible Holder, Walter,** for Gooch crucibles of 25 cc capacity, consisting of a combined rubber stopper and crucible holder with glass funnel shaped tube set in stopper. Will fit the neck of any regular suction flask up to 1 liter capacity. Price includes the funnel tube and rubber part only .40



25352. **Crucible Holder, Rotary**, for the uniform heating of crucibles in the determination of ash, evaporations with concentrated sulphuric acid, incineration of sugar, glycerine, food products, etc. A uniform heating of the entire contents of the crucible is secured by the rotation of the triangle supporting it. Apparatus is arranged with pulley for convenient connection to water motor or other source of power. Complete with one burner as shown in illustration..... 20.00



No. 25366

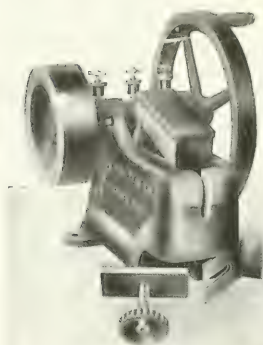
No. 25370

## CRUSHING, GRINDING AND PULVERIZING APPARATUS

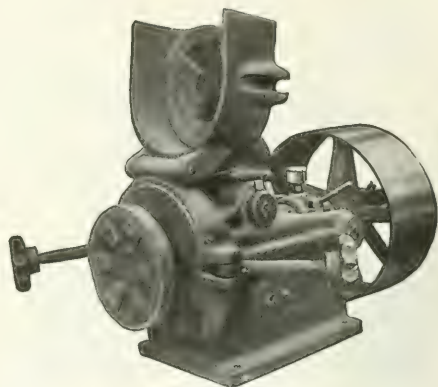
For Ores, Minerals, Drugs, Food Stuffs and Samples of various kinds, Bacteria, Animal Tissues, Lymph, etc. For convenience we have grouped under the above heading apparatus heretofore listed under Crushers, Grinders, Mills, etc., believing that such an arrangement will facilitate selection.

- |        |   |       |
|--------|---|-------|
| 25354. | Crusher, or Bucking Board, of chilled iron. Board is 18 x 24 inches.....  | 10.00 |
| 25358. | “ “ “ similar to No. 25354 but of hardest Chrome Steel, weighs 115 lbs. Rubber is 7 x 8 inches and weighs 30 lbs. The metal does not grind off into the sample. As used in many large steel laboratories and as recommended by the Chemists' Committee of the U. S. Steel Corporation in their "Uniform Methods".....                                 | 45.00 |
| 25362. | Crusher, Weatherhead Patent, a pulverizing and amalgamating mortar which crushes and pulverizes coarse material at one operation. Will handle any material from clay to pig iron. The cover of the machine is so designed that it may be used as a small hand mortar using the end of the handle as a pestle.....                                     | 25.00 |
| 25366. | Mill, Assay, for pulverizing hard substances, such as ores, etc., for analysis. To bolt to bench or table. Will take material about $\frac{3}{4}$ inch in diameter.....   | 10.00 |
| 25368. | Extra plates for above, per set.....  | 2.00  |
| 25370. | Grinding Apparatus with Agate Mortar, for reducing ore to an impalpable powder. It is also used for grinding bacteria and other organic materials. Any desired pressure may be obtained and both mortar and pestle revolve giving a combined rolling and sliding motion. Agate mortar is 110 mm in diameter. Total height of apparatus 18 inches..... | 60.00 |



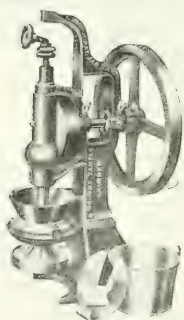


No. 25378

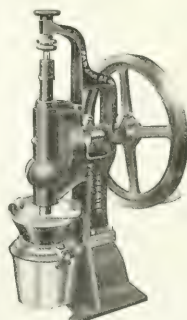


No. 25386

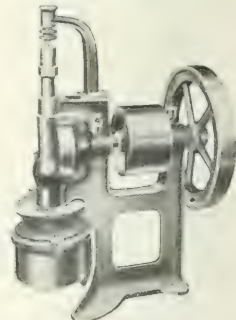
25374. **Crusher, Case Patent.** When driven by power has a capacity of from 100 to 200 lbs. per hour. Jaw opening is  $2\frac{1}{2} \times 3$  inches. The adjustment for fine or coarse work is made by use of patented shims which are inserted between the front jaw plate and the frame, affording a variation of from  $\frac{1}{4}$  inch to 20 mesh. Weight 135 lbs. For hand power only..... 37.00
25378. **Crusher, Case Patent,** exactly same as No. 25374 but arranged for both hand and power driving 40.00
25382. " " large size, for power driving only. Similar to No. 25378 but with jaw opening  $3 \times 4\frac{1}{2}$  inches, capacity 200 to 300 lbs. per hour, shipping weight 350 lbs. Furnished with both tight and loose pulleys..... 100.00
25386. **Pulverizer or Sample Grinder, Iler's Patent Disc.** Will grind an ordinary 8 oz. sample to 100 mesh in less than one minute. Adjustment for degree of fineness can be made while machine is in operation, thus one part of a sample may be ground to 50 mesh, part to 100 mesh and part to 200 mesh while the machine is in motion. Made in two sizes, the small size with 6 inch discs, weighing 130 lbs. and is furnished with 10 inch pulleys and requires  $\frac{1}{2}$  h. p. to operate; the large size has 9 inch discs, weighs 300 lbs., and is furnished with 14 inch pulleys and requires 2 h. p. for operation. With one set of discs.
- |                                     |       |        |
|-------------------------------------|-------|--------|
|                                     | 6     | 9      |
| Each .....                          | 85.00 | 145.00 |
| 25388. Grinding discs, per set..... | 5.00  | 11.00  |



No. 25390



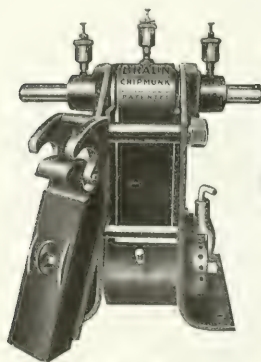
No. 25390



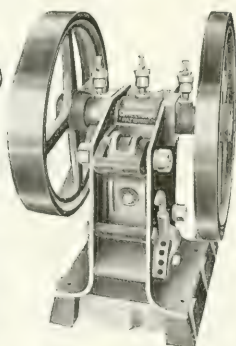
No. 25402

25390. **Sample Grinder, Braun, for Ordinary Ore,** pulverizes to 200 mesh at one grinding. Capacity 4 oz. of ordinary granite rock to 100 mesh in 3 minutes. For hand power only, with one set of discs. 50.00
25392. **Sample Grinder, Braun, for Coal and Coke,** otherwise exactly the same as above..... 50.00
25394. **Sample Grinder, Braun, for Coal and Coke,** with tight and loose pulley for power driving..... 60.00
25396. Grinding Discs, for any of above, per set..... 10.00
25398. **Sample Grinder, Braun, for Iron Ore,** with discs of special carbon steel containing a low percentage of phosphorous. With both tight and loose pulley for power driving..... 85.00
25400. Grinding Discs, of special carbon steel, per set..... 20.00
25402. **Grinder for Iron Ore, Braun, New No. 7,** similar in construction to the Sample Grinders but larger and built for higher speed. Grinding plates are 7 inches in diameter and are of carbon steel with low phosphorous content. Will grind  $\frac{1}{4}$  inch material to 200 mesh. With balance wheel and tight and loose pulley for power only..... 125.00
24504. Grinding Discs of special carbon steel, 7 inches diam., per set..... 22.50
24505. Grinding Discs for coal and coke for above, per set..... 10.00

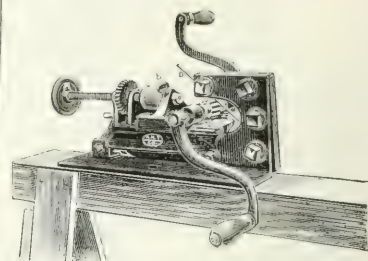




No. 25438

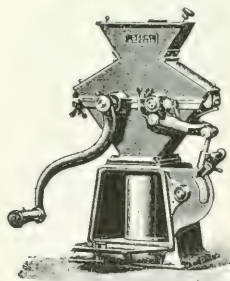


No. 25438

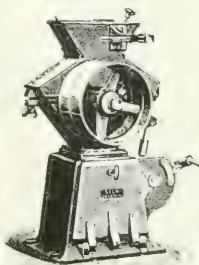


No. 25450

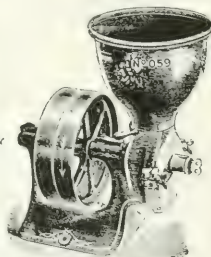
25434. **Crusher, Improved Chipmunk No. 1**, with improved adjusting device consisting of an eccentric bolt passing through the adjusting block. By moving the lever at the side of the machine backward it decreases the opening between the jaws; by moving it forward or towards the operator, it increases this opening. A safety pin is placed in one of the holes which prevents the stationary jaw being brought in contact with the movable jaw. The main feature of this machine is the fact that the frame is made of steel, each side being made in one piece, and both rigidly secured together with strong bolts. The second important feature is the ease with which all of the interior parts are reached for cleaning. The front or stationary jaw can be removed from the crushing chamber in a moment's time, while the rear jaw can be swung backward, thus exposing every part of the machine for cleaning. The vibratory jaw is mounted upon an eccentric shaft at its upper end, and rests against a toggle at its lower end. The eccentric imparts a circular or gyratory movement to the upper end, while the toggle compels the lower end to describe an arc of a small circle. This motion is both forward and downward, or a rubbing motion, and impels a discharge. With jaws 3 x 6 inches, opening  $1\frac{1}{4}$  inches, capacity 300 to 400 lbs. per hour to  $\frac{1}{2}$  mesh and smaller, for both hand and power driving. . . . . 45.00
25438. **Crusher, No. 1a**, as above, but for power driving only, with tight and loose pulleys. . . . . 55.00
25442. **Crusher, No. 3**, " " larger size with jaws 4 x 9 inches, opening  $2\frac{3}{4}$  inches, capacity 1000 to 1500 lbs. per hour to  $\frac{1}{2}$  mesh and smaller, for both hand and power driving. . . . . 110.00
25446. **Crusher, No. 3a**, large size as above but for power driving only, with tight and loose pulleys. . . . . 125.00
25450. **Milling Machine, Laboratory, Johnson**, for taking samples of thin sheets, wire, resistance ribbon nails, steel blades and small samples of all kinds that are irregular in shape for use in carbon determinations in iron and steel analysis. . . . . 28.00



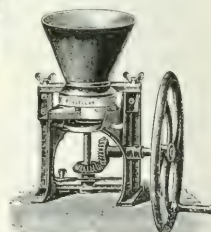
No. 25451



No. 25458



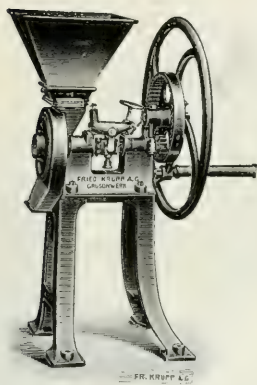
No. 25462



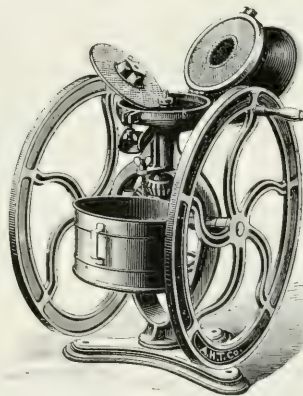
No. 25466

25451. **Mill, Seek**, for coarse grist, a widely used laboratory mill, particularly adaptable for grinding malt to a definite degree of fineness, which is adjustable by a special regulating device. This mill has been adopted by the International Congress of Chemists in Berlin and the Royal German Brewing Academy. For hand driving. . . . . 100.00
25458. **Mill, Seek**, as above, for power driving. . . . . 105.00
25462. **Mill, Grinding and Pulverizing**. Will granulate or grind to fine powder. Pulley 10 inches in diameter by  $1\frac{1}{4}$  inches wide. Is used with great satisfaction in tanning laboratories for grinding leather samples and in cotton seed oil and other laboratories. . . . . 25.00
25466. **Mill, Porcelain**, for grinding either wet or dry substances, for both bacteriological and chemical purposes, with grinding parts of acid-proof porcelain. With grinding surface of 170 mm in diameter, for hand power. . . . . 25.00

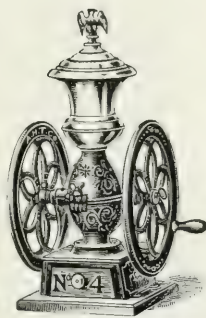




No. 25470

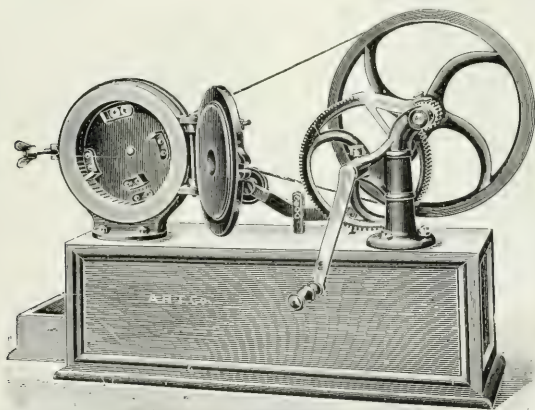


No. 25474



No. 25478

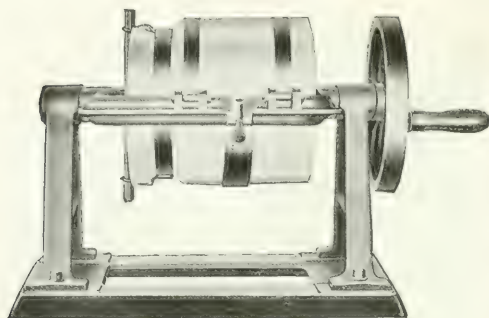
25470. Mill, **Excelsior**, for drugs, food stuffs, seeds and a great variety of other work in grinding laboratory samples. Widely used in Agricultural Experiment Stations. Diameter of grinding discs 6½ inches. Output per hour 25 to 50 lbs.
- Duty Free..... 77.95      Duty Paid..... 94.50
25474. Mill, **Swift B.** Easily adjusted to any degree of fine grinding. Can be opened, cleaned and closed quickly and without changing the degree of fineness as adjusted. Hopper capacity 3 lbs., total height 30 inches, diameter of fly-wheel 34 inches..... 25.00
25478. Mill, **Drug**, for grinding drugs, grains, seeds, etc. Can be regulated to grind to various degrees of fineness.
- |                                 |      |      |      |
|---------------------------------|------|------|------|
| Height, inches.....             | 12½  | 15   | 20½  |
| Diameter of wheels, inches..... | 8    | 8    | 10   |
| Each.....                       | 4.25 | 6.00 | 9.00 |



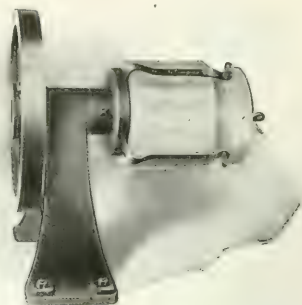
No. 25482

25482. Mill, **Laboratory Drug, Körner**, a new model particularly adapted for the grinding of vegetable substances and the preparation of drugs, feed stuffs, etc.; as supplied by us to the leading pharmaceutical manufacturers in the U. S., and as used in the U. S. Department of Agriculture, etc. See *Chemiker-Zeitung*, 1903 27, No. 42. For hand driving, with improved ball bearings.
- Duty Free..... 115.50      Duty Paid..... 140.00
25486. Mill as above, but for power driving, with improved ball bearings.
- Duty Free..... 82.50      Duty Paid..... 100.00



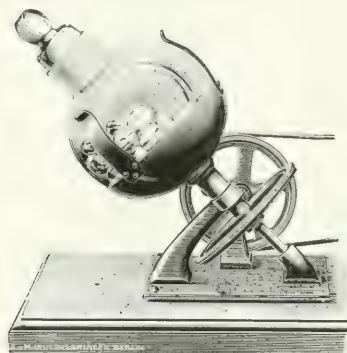


No. 25490

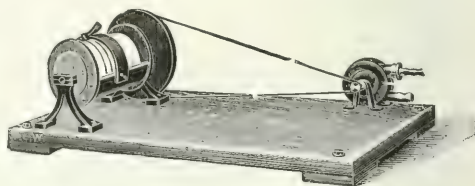


No. 25494

25490. Ball Mill, consisting of a porcelain jar with pebbles. Will handle specimens from  $\frac{1}{4}$  oz. to  $1\frac{1}{2}$  lbs. at one time. Pulley is 9 inches in diameter x 1 inch wide and requires 80 to 100 r. p. m. for fine grinding. Outside dimensions of jar 5.2 x 5.7 inches. Price complete with pebbles..... 15.00
25494. Ball Mill, consisting of a porcelain jar and pebbles. Jar is 8.7 x 9.6 inches. Will handle quantities from a few ounces up to 5 lbs. Wheel pulley 9 inches in diameter, with handle. Requires 60 r. p. m. Complete with pebbles..... 30.00
25498. Extra Jars, for No. 25494, each..... 12.00
25502. Porcelain Pebbles, per lb..... .30

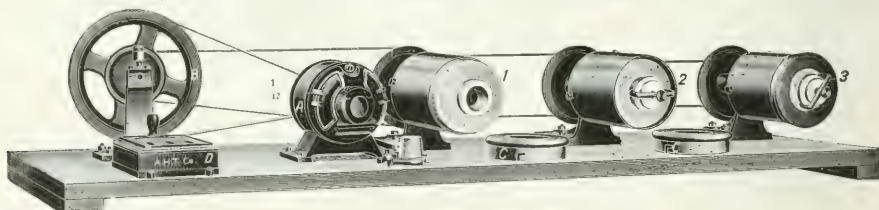


No. 25506



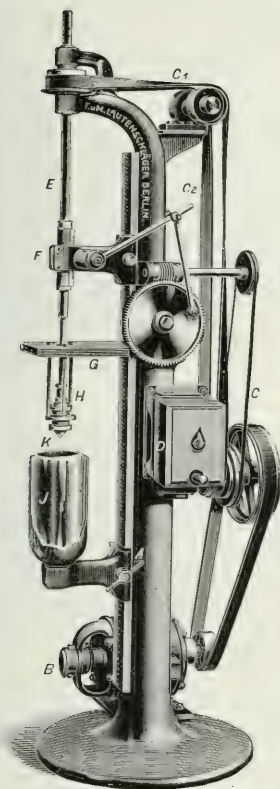
No. 25518

25506. Grinding Apparatus for Bacteria, etc., White, and as used in the laboratories of the Pennsylvania State Live Stock Sanitary Board. Glass globes may be sterilized with the agate marbles inside. Complete with two glass globes and set of agate marbles..... 35.00
25510. Extra Glass Globes, each..... 5.00
25514. " Marbles, per box of 25..... 5.00
25518. Ball Mill, Porcelain, small model on baseboard, with water turbine and including 2 kilos of hard porcelain balls..... 26.40
- Duty Paid..... 32.00

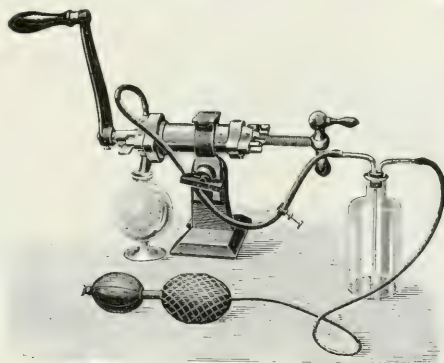


No. 25522 (See description on following page.)

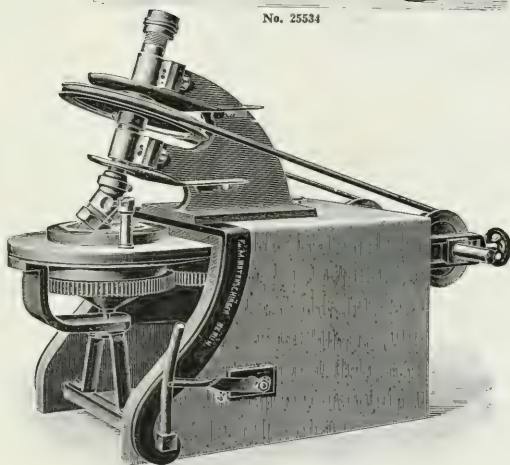
25522. **Grinding Machine for Bacteria etc.**, consisting of from three to five horizontally operated porcelain mills. As furnished by us to the laboratories of Henry Phipps Institute, Philadelphia, Pennsylvania State Live Stock Board, etc. Complete with motor for 110 or 220 volts direct current. Number of Mills.....
- |                | 2      | 3      | 4      | 5      |
|----------------|--------|--------|--------|--------|
| Duty Free..... | 136.15 | 163.35 | 199.65 | 252.30 |
| Duty Paid..... | 165.00 | 198.00 | 242.00 | 305.80 |
25526. Extra Porcelain Mills for above, capacity 1200 cc. Can be sterilized.  
Duty Free, each..... 8.75      Duty Paid, each..... 11.50



No. 25539

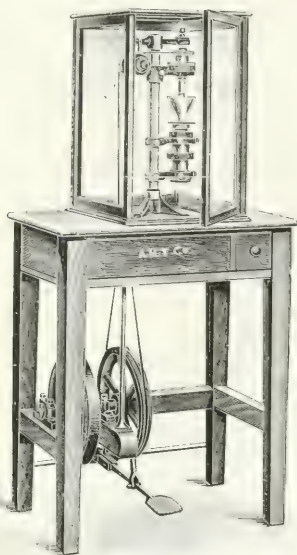


No. 25534

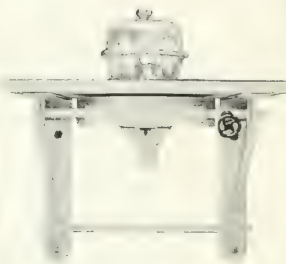


No. 25538

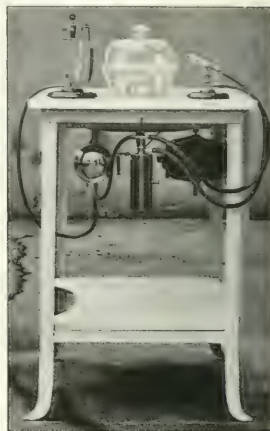
25530. **Grinding Apparatus, Macfaedyn, for Bacteria and Frozen Organisms.** The construction of this apparatus is based upon the fact that the organisms pulverize better when frozen by liquid air to the hardness of glass. The mortar is operated in a liquid air vessel. Complete with motor. Current and voltage must be specified in ordering.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 591.70 | Duty Paid..... | 717.20 |
|----------------|--------|----------------|--------|
25534. **Grinding Apparatus for Organs, Tumors, etc.**, by means of pressure applied during the cutting. Model of the Hygienic Institute, Berlin. The substances can be finely enough ground as to be injected directly.
- |                      |       |       |
|----------------------|-------|-------|
| Capacity, grams..... | 10    | 50    |
| Duty Free.....       | 24.75 | 49.50 |
| Duty Paid.....       | 30.00 | 60.00 |
25538. **Grinding Machine for Bacteria, etc., Koch,** as supplied by us to the laboratories of the Henry Phipps Institute, Philadelphia. With motor. Current and voltage must be specified in ordering.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 435.60 | Duty Paid..... | 528.00 |
|----------------|--------|----------------|--------|



No. 25542

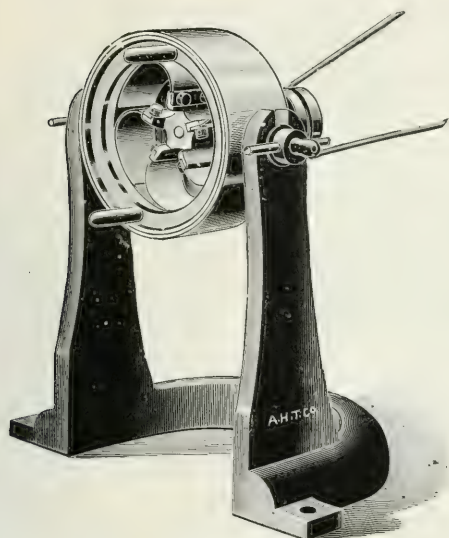


No. 25558



No. 25570

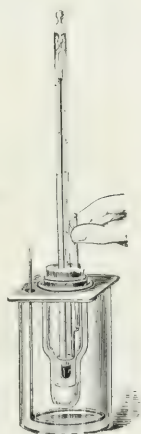
- 25542. Grinding Machine for the Preparation of Animal Lymph.** Devised for the thorough mixing of the animal lymph with the necessary glycerine. The lymph is poured into the conical shaped funnel and is carried by means of the revolving spindle through the cylinder. The spindle is of pure nickel screwed with a thread, gradually tapering from a rough thread at top to a very fine thread at bottom. The inside of the cylinder is also of pure nickel. The mixing spindle is run on a compound ballbearing and is so arranged that it can easily be removed for sterilizing and replaced without any difficulty. In order that the bore of the cylinder may be easily cleaned and examined the cylinder is cut into two halves and held together when in use by the clamps shown. The machine is mounted on a strong table with marble top and the working part is encased under a glass cover with hinged door. The cover need not be removed when the machine is at work. By means of this machine the lymph is thoroughly mixed in about 15 minutes without any loss of the lymph which is kept perfectly free from dust. As supplied by us to some of the leading manufacturers of biological products in the U. S. Complete as illustrated, for foot power, with treadle and driving wheel.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 142.00 | Duty Paid..... | 172.00 |
|----------------|--------|----------------|--------|
- 25546. Grinding Machine,** exactly same as No. 25542 but fitted with pulley for power driving.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 122.10 | Duty Paid..... | 148.00 |
|----------------|--------|----------------|--------|
- 25550. Grinding Machine,** exactly same as No. 25542 but with electric motor for direct current and adjustable resistance coils for starting. Voltage must be stated in ordering.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 204.60 | Duty Paid..... | 248.00 |
|----------------|--------|----------------|--------|
- 25554. Grinding Machine,** exactly same as No. 25542 but with electric motor for alternating current and with countershaft. Voltage must be stated in ordering.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 224.50 | Duty Paid..... | 272.00 |
|----------------|--------|----------------|--------|
- 25558. Grinding Mill for Lymph.** Model of the K. K. Impfstoff-Gewinnungs-Anstalt, Vienna; consisting entirely of glass, permitting the whole utensil to be repeatedly sterilized. The complete outfit is mounted on an enamelled iron bracket with marble top, and water motor for driving built in.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 115.20 | Duty Paid..... | 158.40 |
|----------------|--------|----------------|--------|
- 25562. Grinding Mill for Lymph** as above, but with electric motor drive. In ordering please state current.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 204.00 | Duty Paid..... | 280.50 |
|----------------|--------|----------------|--------|
- 25566. Filling Apparatus for Lymph.** Model of the K. K. Impfstoff-Gewinnungs-Anstalt, Vienna; improved construction, with complete equipment for the adjustment of pressure and blast lamp for melting the capillary tubing, on enamelled iron table, with electric motor.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 228.00 | Duty Paid..... | 313.50 |
|----------------|--------|----------------|--------|
- 25570. Combined Lymph Grinding and Filling Apparatus,** consisting of outfit No. 25562 for grinding, and outfit No. 25566 for filling. Complete, on enamelled iron table.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 468.00 | Duty Paid..... | 643.50 |
|----------------|--------|----------------|--------|



No. 25574



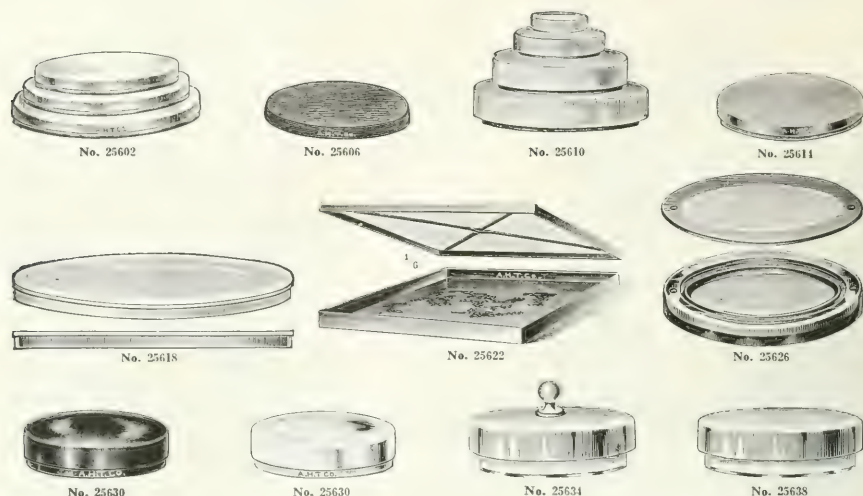
No. 25578



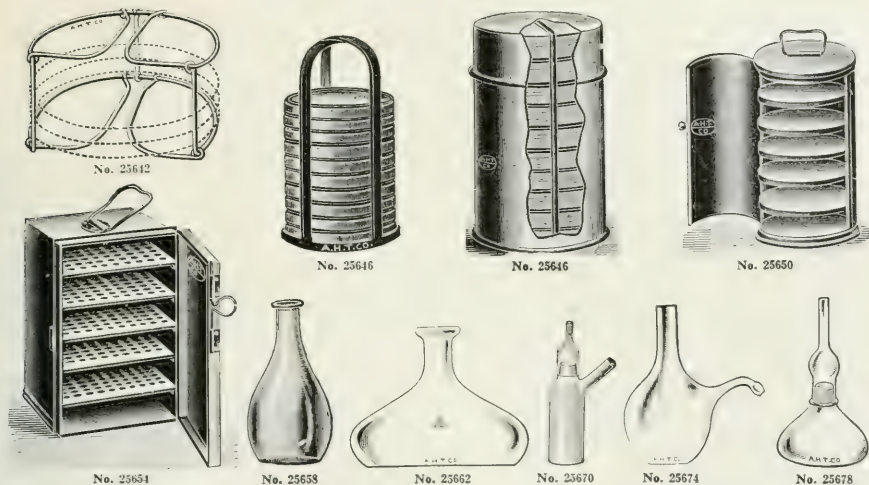
No. 25586

- 25574. Grinding Apparatus, Borrel, for Organic Tissues, Bacteria, Lymph, etc.** The grinding is accomplished by means of flexible steel leaves. The normal speed is about 2000 r. p. m. and the front (shown removed in illustration) is of glass so that the entire process may be observed. All the working parts may be readily sterilized and the machine is well suited for the grinding of moist as well as dry material.  
 Duty Free..... 87.50      Duty Paid..... 105.00
- 25578. Cryoscope, Friedenthal, for Molecular Weight Determination** by depression of the freezing point in physiological and clinical work. See *Zentralblatt für Physiologie 1899-1900*. Outfit consists of the following:—  
**Cooling Jar**, with wooden cover nickel stirrer, one freezing tube with rubber stopper and one freezing rod.  
**Thermometer**, for the cooling mixture, from  $-20$  to  $+49^{\circ}$  C. in single degrees.  
**Stirrer**, for the solution, consisting of glass rod with platinum ring. Approximately 1.2 grams of platinum.  
**Thermometer, Heidenhain**, from  $+0.5^{\circ}$  to  $-25^{\circ}$  C. in  $\frac{1}{10}$ ths. As in medical work only a few degrees under zero are required in the thermometer, this thermometer is furnished with fixed graduations so that the laborious adjustment of zero in the regular Beckmann thermometers is avoided. When small drops of mercury are found in the enlargement at the top of the tube they must be carefully run into the tube by inversion of the thermometer.  
 Complete outfit as described.  
 Duty Free..... 10.75      Stock..... 16.25
- 25582. Thermometer, Heidenhain**, as described above..... 9.00
- 25586. Cryoscope, Drucker-Burrian, for Molecular Weight Determination** by depression of the freezing point in physiological and clinical work, designed for small quantities, only 1.5 cc of solution being necessary. See *Zentralblatt für Physiologie, Band XXII, Nr. 22*. Outfit consists of the following:  
**Cooling Jar**, with nickel plated cover and stirrer.  
**Freezing Tube**, with cork ring and air jacket with cork for both thermometer and stirrer.  
**Stirrer**, of glass with platinum ring, approximately 1.2 grams of platinum.  
**Thermometer**, with fixed degrees as in Heidenhain No. 25582, from  $+0.5^{\circ}$  to  $-5^{\circ}$  C. in  $\frac{1}{10}$ ths, total length 24 cm, with specially small bulb designed especially for this apparatus.  
 Complete outfit as described.  
 Duty Free..... 10.05      Stock..... 15.25
- 25590. Thermometer only**, as described above..... 9.00

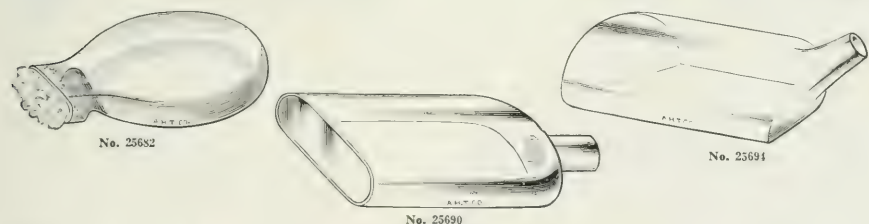




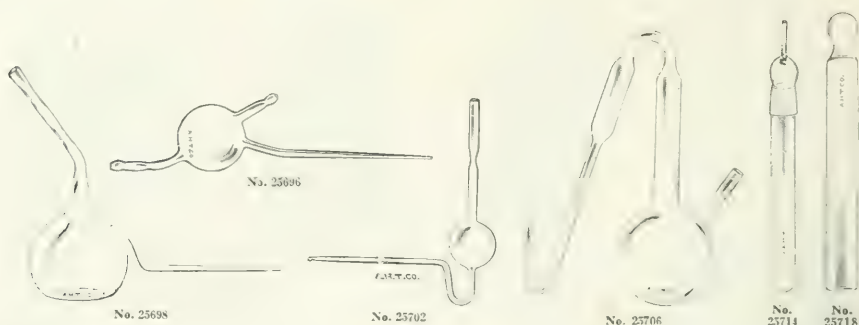
- 25602. Culture Dishes, Petri, of glass, fitted in pairs.** The 100 x 100 mm size is the standard Petri dish for bacteriological work throughout the U. S. The glass is very free from striae and will stand repeated sterilization with a minimum of breakage and corrosion.
- |                   |     |     |     |
|-------------------|-----|-----|-----|
| Diameter, mm..... | 100 | 120 | 150 |
| Depth, mm.....    | 10  | 10  | 10  |
| Per pair.....     | .20 | .40 | .60 |
- 25606. Covers, Porous Earthenware, for culture dishes 100 mm in diameter. Each.....** .15
- 25610. Culture Dishes, of glass, fitted in pairs, with top and bottom surface as free from striae as possible, for cultures, mounting of specimens in gelatine, etc.**
- |                   |     |     |     |     |     |     |     |     |     |      |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| Diameter, mm..... | 40  | 50  | 60  | 80  | 100 | 120 | 150 | 200 | 220 | 240  |
| Depth, mm.....    | 10  | 10  | 10  | 10  | 15  | 20  | 20  | 35  | 40  | 50   |
| Per pair.....     | .15 | .15 | .18 | .21 | .30 | .40 | .60 | .80 | .90 | 1.30 |
- 25614. Culture Dish, of glass, with top and bottom polished, permitting the examination of cultures with higher power objectives than the ordinary Petri dish. So-called Pasteur dish. Fitted in pairs.**
- |                   |     |     |
|-------------------|-----|-----|
| Diameter, mm..... | 100 | 100 |
| Depth, mm.....    | 5   | 10  |
| Per pair.....     | .50 | .50 |
- 25618. Culture Dish, of glass, fitted in pairs, with top and bottom of polished plate glass. Glass rings forming sides are cemented on at 600° C. in a special furnace. Especially valuable for photomicrographic work and use with microscope because of the freedom from distortion as compared with blown dishes. Will stand sterilization as well as the ordinary Petri dish. Per pair.....** 1.25
- 25622. Culture Dish, White Metal, Friedberger-Kanten, rectangular form, 250 mm wide by 10 mm deep. 3.00**
- 25626. Culture Dishes, Gabritschewsky, as originally used for Tetanus cultures but as now used for growing tissues in plasma. The culture is made on the under side of the lid. The circular concave portion of the dish serves to collect the products of metabolism falling from the culture, the circular trough around the bottom dish being used for water. By means of the apertures provided a slight turn of the lid permits or excludes the entrance of air into the culture compartment. Per pair.....** .75
- 25630. Culture Dish, Porcelain, Neisser. Dishes are 100 mm in diameter x 10 mm deep and are furnished in both black and white glazed porcelain.**
- |            |       |       |
|------------|-------|-------|
| Color..... | White | Black |
| Each.....  | .60   | .75   |
- 25634. Culture Dishes or Moist Chambers, large double dishes of heavy glass, with loosely fitting covers with knob.**
- |                            |      |      |
|----------------------------|------|------|
| Inside height, mm.....     | 70   | 80   |
| Diameter of cover, mm..... | 200  | 240  |
| Each.....                  | 1.25 | 2.00 |
- 25638. Culture Dishes or Moist Chambers, same as No. 25634 but without knob on cover.**
- |                            |      |      |
|----------------------------|------|------|
| Inside height, mm.....     | 70   | 80   |
| Diameter of cover, mm..... | 200  | 240  |
| Each.....                  | 1.00 | 1.75 |



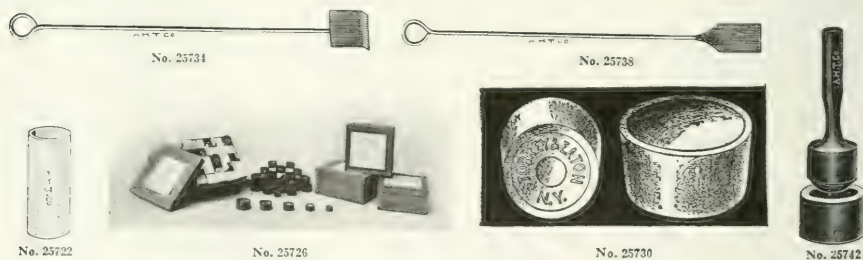
25642. Culture Dish Holder, Ravenel, for dishes 100 mm diameter, of spring brass, nickel-plated. A very convenient device for handling dishes in the incubator and sterilizer. To hold, dishes..... 3 6  
Each..... .50 .75
25646. Culture Dish Holder, of polished copper, with removable inside tray. To take 100 mm dishes. Height 9 inches..... 3.00
25650. Culture Dish Holder, of sheet copper, nickel plated, with door and handle. For dishes 100 mm in diameter. Height 8 inches..... 6.00
25654. Culture Dish Holder, rectangular form, of nickel plated copper. For dishes 100 mm in diameter... 6.00
25653. Culture Flasks, Koch.  
Capacity, cc..... 50 100  
Each..... .12 .15
25662. Culture Flask, Fernbach, so-called Antitoxin flask. Shape as used in the Antitoxin Laboratories of the Philadelphia Board of Health, 8 inches high and 10 inches in diameter at base..... 2.00
25666. Culture Flask, Freudreich, with ear ground on, 25 cc capacity..... .35
25670. " " " " with side neck, capacity 25 cc..... .40
25674. " " " " Lister, for serum capacity 500 cc..... .60
25678. " " " " Miquel, with flat bottom and ground on cap. Capacity, cc... 50 75 100  
Each..... .35 .40 .45



25682. Culture Flask, Kollé, with indentation to prevent flowing out of medium. Flasks are about 3 cm deep. As used in the preparation of typhoid vaccine in the U. S. Army Medical Department.  
Diameter, cm..... 13  
Each..... .50 .60
25690. Culture Flask, Roux, 220 mm long, 120 mm wide and 53 mm deep..... .80
25694. " " " " Piorkowski, 140 mm long, 140 mm wide and 50 mm high..... .80



25696.	Culture Flask, Martin, for toxin.				
	Capacity, cc.....	125	250	500	1000
	Each.....	.35	.50	.75	1.00
25698.	Culture Flasks, Chamberland.				
	Capacity, cc.....	125	250	500	1000
	Each.....	.40	.50	.60	.80
25702.	Culture Flasks, Miquel, pipette form.				.30
25706.	Culture Flask, Pasteur, with side tubulations and constricted neck.				
	Capacity, cc.....	100	250	500	1000
	Each.....	.40	.50	.60	.80
25710.	Culture Flask, Pasteur, Jena Glass. Same shape as above. Recommended because of insolubility of glass during sterilization. Capacity 500 cc.....				1.30
25714.	Culture Tube, Gayon, 220 mm long by 20 mm diameter.....				.30
25718.	" " Roux, for potato cultures, 155 mm long by 20 mm diameter.....				.10



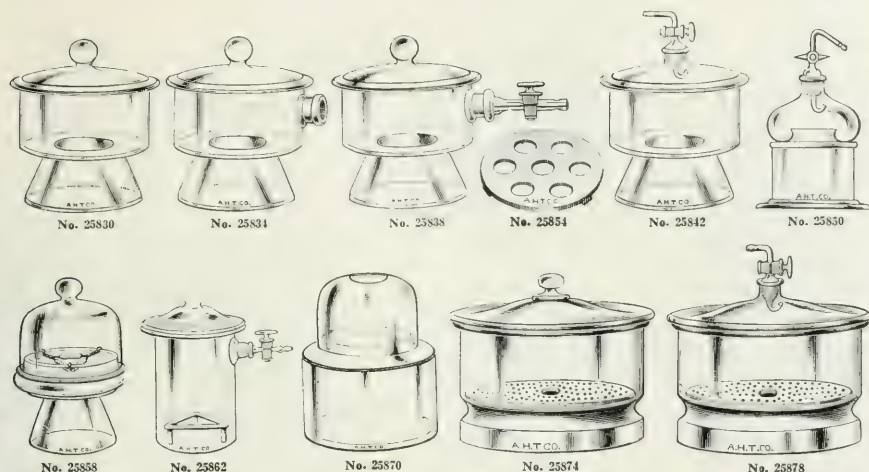
25722.	Cups or Cells, porous, of unglazed porcelain, for use in batteries, etc								
	Height, mm.....	75	75	95	110	135	185	200	
	Diameter, mm.....	38	50	50	50	65	80	80	
	Each.....	.10	.15	.18	.20	.30	.40	.55	
25726.	Cupels, Brownite, for assaying, are absolutely uniform in composition and density, give a lower silver loss than bone ash, and are guaranteed against breakage in shipment. They should be hot before receiving the button.								
	Diameter, inches.....			1	1 1/4	1 1/2	1 3/4	2	
	Height, inches.....			1	1 1/4	1 1/2	1 3/4	2	
	Per 100.....			1.00	1.25	1.75	2.00	2.50	
25730.	Cupels, Torry & Eaton, of best washed bone ash.								
	Diameter, inches.....	1	1 1/4	1 1/2	1 3/4	1 3/4	1 3/4	2	
	Will absorb, grams.....	10	15	20	25	30	40	50	75
	Per 100.....	2.00	2.25	2.50	3.00	3.40	3.75	4.00	5.00
25734.	Cupel Rake, of iron, 24 inches long.....								.45
25738.	" Shovel, of iron, 24 inches long.....								.45
25742.	Cupel Mould, of brass.								
	Size, inches.....					1 1/4	1 1/2	1 3/4	
	Each.....					2.50	2.75	3.00	



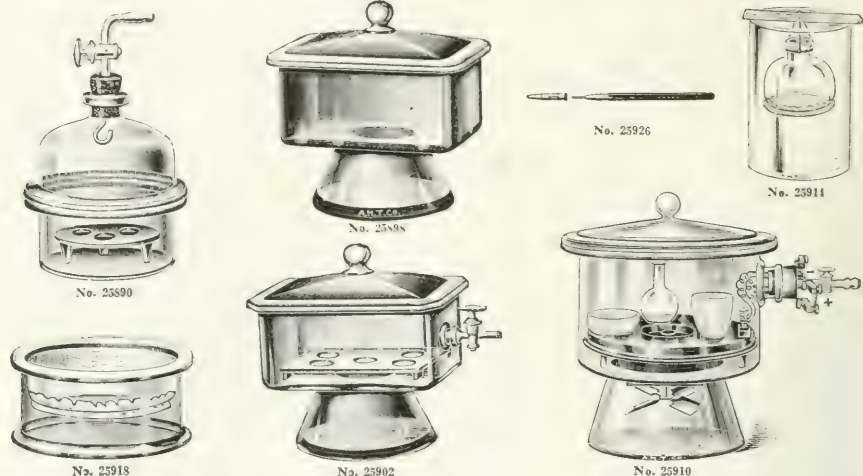
<b>25750.</b>	<b>Cylinders, with spout.</b>								
	Height, mm.....	100	125	125	150	150	175	200	210
	Diameter, mm.....	25	25	40	25	40	30	30	40
	Each.....	.15	.16	.18	.16	.22	.24	.25	.26
	Height, mm.....	250	260	300	315	350	365	375	450
	Diameter, mm.....	40	45	40	50	65	50	65	50
	Each.....	.30	.35	.35	.45	.55	.50	.60	.65
<b>25754.</b>	<b>Cylinders, with rim around top, top not ground.</b>								
	Height, mm.....	100	125	125	150	150	175	200	210
	Diameter, mm.....	25	25	40	25	40	30	30	40
	Each.....	.15	.16	.18	.16	.22	.24	.25	.26
	Height, mm.....	260	300	300	315	350	365	375	450
	Diameter, mm.....	45	40	50	65	50	65	50	50
	Each.....	.35	.35	.45	.55	.50	.60	.50	.75
<b>25758.</b>	<b>Cylinders, with enlarged top. Especially adapted for use with hydrometers.</b>								
	Height, mm.....					350	300		400
	Diameter at top, mm.....					50	75		75
	“ “ bottom mm.....					40	50		65
	Each.....					.50	.70		.90
<b>25762.</b>	<b>Cylinders, with ground rim at top for use with glass plates.</b>								
	Height, mm.....			200		300	300		400
	Diameter, mm.....			100		80	100		80
	Each.....			.75		.80	1.25		1.25
<b>25766.</b>	<b>Cylinders, with side funnel for acid chambers, so-called “drop cups.”</b>								
	Height of cylinder, mm.....						125		150
	Each.....						.50		.60
<b>25770.</b>	<b>Cylinders, Graduated, with single graduations, and spout, on foot.</b>								
	Capacity, cc.....	5	10	15	25	50	100		
	Each.....	.25	.28	.30	.35	.40	.50		.50
	Capacity, cc.....	200	250	500	1000	2000	3000		
	Each.....	.75	.80	1.00	1.75	3.25	4.00		
<b>25774.</b>	<b>Cylinders, Graduated, with double graduations, and spout, on foot.</b>								
	Capacity, cc.....	5	10	25	50	100	200	250	500
	Each.....	.28	.30	.40	.50	.65	.80	1.00	1.20
<b>25778.</b>	<b>Cylinders, Graduated, with single graduations and ground glass stopper. So called “mixing bottle.”</b>								
	Capacity, cc.....	10	25	50	100	150	200	250	500
	Each.....	.50	.55	.60	.80	.90	1.00	1.15	1.35
<b>25782.</b>	<b>Cylinders, Graduated, same as No. 25778. but with double graduations.</b>								
	Capacity, cc.....		10	25	50	100	250	500	1000
	Each.....		.50	.60	.70	.80	1.20	.65	2.45
<b>25784.</b>	<b>Cylinders, Graduated, New Jena Glass, with single graduations.</b>								
	Capacity, cc.....		50	100	200	250	500	1000	
	Each.....		.90	1.10	1.35	1.50	2.00	3.00	
<b>25786.</b>	<b>Cylinder, Graduated, for use with the official Brown-Duvel Moisture Tester. With enlarged top, reading in percentages up to 16%. See Bulletin 56 of the U. S. Bureau of Plant Industry.....</b>								.40
<b>25788.</b>	<b>Cylinder with Outlet but without spout, of well-annealed thin glass guaranteed to stand repeated sterilization; 4 inches in diameter and 15 inches high, with tubulation at the side; as used in the laboratory of Soil Bacteriology of the U. S. Department of Agriculture.....</b>								1.25
<b>25790.</b>	<b>Cylinder, as used in testing sewage, with conical end graduated from 0 to 50 cc, total capacity 1000 cc. 2.50</b>								
<b>25792.</b>	<b>Cylinder, as above, of conical shape throughout, with graduations at points from 0 to 100 cc, total capacity, 1000 cc.....</b>								2.25



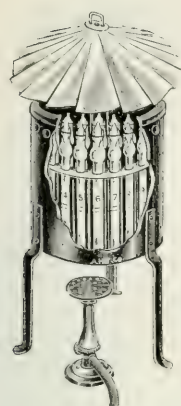




25826.	Demijohns, of glass, with rattan cover. Capacity, gallons.....	1	2	3	5
	Each.....	.50	.75	1.00	1.50
25830.	Desiccator, Scheibler, extra fine quality, with wide, finely ground flange to which covers are evenly and accurately fitted.				
	Diameter, mm.....	100	120	150	200
	Each.....	1.00	1.25	1.50	2.50
25834.	Desiccator, Scheibler, exactly like No. 25830, 150 mm diameter, but with side tubulation to take rubber stopper.....				2.25
25838.	Desiccator, Scheibler, exactly like No. 25834, but with a stout stopcock ground in side tubulation.				
	Diameter, mm.....	120	150	200	250
	Each.....	2.80	3.50	5.50	6.50
25842.	Desiccator, Scheibler, identical with No. 25830, but with ground in glass stopcock and hook in lid.				
	Diameter, 150 mm.....				3.50
25846.	" Scheibler, ordinary quality. Recommended as a very satisfactory desiccator at an unusually low price. Shape same as No. 25830.				
	Diameter, inches.....		4	5	6
	Each.....		.60	.90	1.25
25850.	Desiccator, Hempel, with glass stopcock and hook for suspension. Diameter 150 mm.....				5.00
25854.	Porcelain Plates, glazed, especially intended for use in Scheibler desiccators. On three small feet and with from three to eight holes depending upon the diameter of the plate.				
	Diameter, mm.....	95	115	140	190
	Each.....	.75	.85	1.25	2.00
25858.	Desiccator, Atwater, with triangle inside, diameter about 4½ inches.....				2.50
25862.	Desiccator, Mitscherlich, with glass tripod for taking beakers and deep vessels, 150 mm deep, and 100 mm in diameter, with tubulation and ground in stopcock.....				2.00
25866.	Extra glass tripod for above.....				.25
25870.	Desiccator, Fresenius. Diameter, mm.....			80	100
	Each.....			1.00	1.20
25874.	Desiccator, Fruhling and Schultz, with glazed porcelain plate profusely perforated with small holes.				
	Diameter, mm.....			200	250
	Each.....			7.00	10.00
25878.	Desiccator, Fruhling and Schultz, same as above but with stopcock in lid.				
	Diameter, mm.....			200	250
	Each.....			9.15	13.00
25882.	Porcelain Plates, only, for Fruhling & Schultz Desiccators, glazed and profusely perforated with small holes.				
	Diameter, mm.....			190	230
	Each.....			1.75	2.10
25886.	Porcelain Plates, only, for Fruhling and Schultz Desiccators, with holes 26 mm in diameter for taking crucibles.				
	Diameter, mm.....			190	230
	Each.....			1.75	2.10



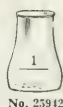
25890.	Desiccator, stoutly made to withstand considerable pressure. With glass stopcock, rubber stopper and hook in lid. Diameter, 140 mm.	5.25	
25894.	Stopcock, only, for No. 25890 desiccator.		1.00
25898.	Desiccator, rectangular form, a new, very practical model.		
	Length, mm.	145	185
	Width, mm.	110	140
	Height, mm.	90	90
	Each.	5.50	7.50
25902.	Desiccator, exactly same as No. 25898 but with stopcock ground in side tubulation, but without porcelain plate as shown in illustration.		
	Length, mm.	145	185
	Each.	9.50	11.50
25906.	Porcelain Plates, rectangular, glazed for use in either of above desiccators and as shown in illustration of No. 25902.		
	Length, mm.	125	170
	Width, mm.	90	125
	Each.	1.80	3.35
Note.—Desiccators No. 25898 and 25902 can be furnished in amber glass on special order.			
25910.	Desiccator, with Electric Hot Plate and Electric Fan. The electric motor and fan are mounted on a nickel desiccator plate and motor may be operated by a three-volt battery. The air circulation from the fan causes much more rapid drying. The tubulation is provided with glass stopcock in addition to electrical connections so that the desiccator may be used for drying in vacuum and with the electric hot plate in place on the nickel support becomes a small vacuum drying oven. The electric hot plate is regularly furnished for connection with 110 volts d. c.; 180 mm in diameter. Complete with nickel support, fan, motor, electric hot plate for 110 volts and support, but without battery.		
	Duty Free.	18.00	
	Stock.		30.00
25914.	Dialyzers, consisting of an open top bell glass suspended in a glass jar. The large end of the bell glass is covered with parchment.		
	Capacity, liters.	2	4
	Each.	1.25	1.50
25918.	Dialyzers, Graham. The inner glass to which parchment paper is fastened is supported by its rim upon the edge of the outer vessel.		
	Diameter, mm.	100	150 200
	Each.	1.30	1.80 2.25
25922.	Dialyzer Tubing, of heavy parchment.		
	Diameter, mm.	45	55
	Per meter.	.08	.10
25926.	Diamond, for writing on glass. A fine diamond mounted in a metal handle with removable cap.		2.50
25930.	Diffusion Shells, Schleicher & Schüll No. 579. These shells offer a large dialyzing surface with the smallest possible volume and enable work to be carried on with a small outside vessel. Not suitable for Abderhalden technique.		
	Size, mm.	100 x 16	100 x 35—40
	Per box of 25.	3.15	7.35



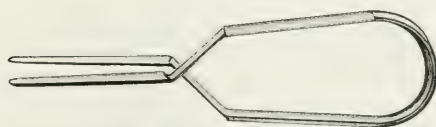
No. 25962



No. 25951 No. 25946



No. 25942



No. 25950



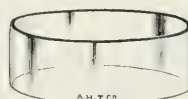
No. 26014



No. 26000



No. 26004



No. 26008



No. 26012

**DIALYZING METHOD, ABDERHALDEN.** For convenience we are listing under this heading the special Diffusion Shells, Flasks, Tubes, etc., as used in the Abderhalden dialyzing method of serodiagnosis. For Polariscopes, etc., required for the optical method, see Polariscopes No. 34380 with special electric heating attachment No. 34392 and special tubes No. 34396.

25934. **Diffusion Shells, Abderhalden.** This is Schleicher & Schüll's No. 579a Diffusion Shell which differs from the regular No. 579 in that they allow peptone to pass and retain the albumen. Size 50 x 16 mm. Per box of 25..... 3.00

25938. **Diffusion Shells, Tested, Abderhalden.** as above, tested in Halle for their permeability for peptone and retention of albumen, in accordance with the methods established by Abderhalden. In sealed sterile bottles containing 25 each. Price..... 10.00

**Flasks and Tubes, Abderhalden,** for use with Diffusion Shells No. 579a for Abderhalden serodiagnosis by the dialyzing method, consisting of a wide mouth special shape Erlenmeyer flask, permitting the easy entrance and withdrawal of the diffusion shells. The size of these flasks is such that the dialysate reaches a proper level after the diffusion shell has been filled with the serum to be tested. The marks on the flasks and tubes render the measuring of identical movements very easy. Both flasks and tubes are supplied in duplicate and each pair carries the same individual number, obviating the possibility of confusion between the tested and untested membranes. As used in the Laboratory of Internal Medicine, Phipps Psychiatric Clinic, Johns Hopkins University. Both flasks and tubes are of Jena glass. Flasks are marked at 20 cc and tubes at 10 cc.

25942. **Flasks,** as above described with identical numbers, per pair..... .60

25946. **Tubes,** as above described with identical numbers, per pair..... .50

25950. **Tongs,** for the convenient handling and washing of the dialyzing shells, arranged for convenient opening and closing by simple hand pressure; heavily nickel plated..... 3.50

25954. **Test Tube,** with bulb to prevent boiling over and with two marks, at 10 and 12 cc and serial number. Each..... .25

25958. **Glass Bulb,** with vents on the side for stoppering above test tubes. Each..... .20

25962. **Water Bath, Abderhalden,** with aluminum vane stirring device, of heavy copper, with Teclu burner and inset for 25 of the above test tubes..... 25.00

25966. **Ninhydrin, (Triketohydrindene hydrate).** Per  $\frac{1}{10}$  gram vial..... .25

25970. **Silk Peptone, Hoechst.** Per gram..... .50

25974. **Placentapeptone.** Per gram..... 5.50

26000. **Dish, Boas,** for feces experiments. Lower half of dish is black enamelled and upper half transparent. With air-tight rubber ring and glass spatula..... 3.50

26004. **Dishes, Crystallizing,** of thin blown glass, high form with polished edges.

Height, mm..... 40 50 60 80 100 120 150

Diameter, mm..... 40 50 60 80 100 120 150

Each..... .14 .15 .16 .20 .25 .30 .50

26008. **Dishes, Crystallizing,** of thin blown glass, low form, with polished edges.

Diameter, mm..... 30 40 50 60 70 80 90 100 110 130

Each..... .10 .10 .10 .12 .14 .16 .18 .20 .25 .30

Diameter, mm..... 150 170 190 210 240 270 300 350 400 450

Each..... .40 .50 .60 .70 .90 1.50 2.25 3.25 4.50 6.50

26012. **Dish, Crystallizing,** of thin blown glass with polished edge; as used in tanning laboratories. Height 50 mm diameter 70 mm. Approximate weight 35 grams. Each..... .15

26014. **Dishes, Crystallizing, New Jena Glass,** low form, with spout.

Diameter, mm..... 40 50 60 70 80 90

Each..... .17 .18 .19 .22 .28 .32

Diameter, mm..... 100 125 150 200 250 300

Each..... .38 .60 .80 1.05 1.25 1.90





No. 26016



No. 26020



No. 26024—small



No. 26025—small



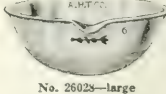
No. 26036



No. 26040



No. 26024—large



No. 26025—large

26016. Dishes, Thüringian Porcelain, glazed inside only, shallow form. Recommended as an inexpensive dish for students' use.

Capacity, cc.....	20	35	50	75	125	200	500	750	1100
Diameter, mm.....	58	70	82	92	108	135	165	200	235
Each.....	.07	.08	.10	.14	.18	.20	.25	.35	.60
Capacity, cc.....	1500	2000	2500	3400	4300	5200	7000	10000	
Diameter, mm.....	265	285	305	315	345	375	415	450	
Each.....	.80	1.10	1.40	1.60	2.00	2.95	3.90	5.85	

26020. Dishes, Thüringian Porcelain, glazed inside only, deep form, with heavy welted rim. Same quality as No. 26016.

Diameter, mm....	65	75	85	94	112	120	150	170	210	240	265	285
Capacity, cc.....	35	50	75	100	170	225	450	600	1150	1500	2250	2750
Each.....	.10	.10	.12	.14	.17	.30	.40	.55	.70	.95	1.40	1.70

26024. Dishes, Sanitäts Porcelain, trade mark "blue arrow," glazed both inside and outside up to and including 120 mm diameter size. Larger sizes glazed inside only as shown in large dish in illustration.

Capacity, cc.....	20	50	75	90	115	160	225	240	350
Diameter, mm.....	50	70	80	85	95	105	110	120	150
Each.....	.08	.10	.12	.14	.17	.20	.30	.35	.55
Capacity, cc.....	700	1000	1250	1500	2000	3000	5000	8500	15000
Diameter, mm.....	190	210	235	255	275	300	355	400	470
Each.....	.90	.95	1.35	1.55	1.95	2.65	3.95	8.30	11.75

26028. Dishes, Royal Berlin Porcelain, trade mark "blue seepster," glazed inside and outside up to and including No. 5. Larger sizes glazed inside only and for a short distance below the rim on the outside, remainder of outside surface being unglazed. See larger dish of illustration.

Number.....	000	00	0	1	2	3	4	5	6	
Capacity, cc.....	35	60	80	100	140	175	210	300	385	
Diameter, mm.....	60	70	80	85	90	100	110	120	145	
Each.....	.15	.18	.21	.25	.35	.40	.45	.55	.70	
Number.....	6a	6b	7	8	8a	9	10	11	12	13
Capacity, cc.....	535	690	765	1285	1430	2200	3250	5700	10000	16500
Diameter, mm.....	162	170	185	215	230	265	305	360	400	460
Each.....	.85	.90	.95	1.20	1.75	2.10	4.00	5.60	13.50	22.50

26032. Dishes, Royal Berlin Porcelain, same shape and execution as No. 26028 but with inside glazing of a dark green color.

Capacity, cc.....							80	175	300
Diameter, mm.....							80	100	120
Each.....							.60	1.00	1.20

26036. Dishes, Royal Berlin Porcelain, shallow form, with comparatively flat bottom. Glazed inside and for a short distance below the rim on the outside, remainder of outside surface being unglazed.

Number.....	1	2	3	4	5	6	7
Capacity, cc.....	45	60	95	160	200	350	550
Diameter, mm.....	70	80	95	105	120	140	160
Each.....	.20	.25	.40	.50	.60	.75	.90

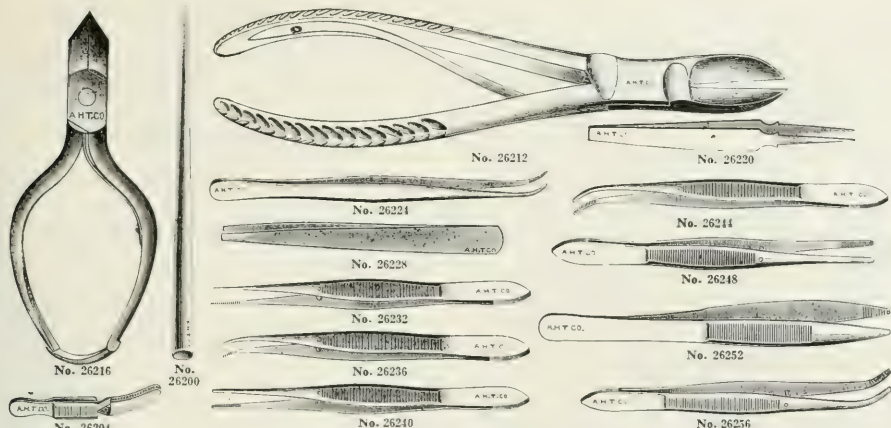
26040. Dishes, Royal Meissen Porcelain, trade mark "crossed swords" in blue, glazed inside and for a short distance below the rim on outside, remainder of outside surface being unglazed.

Number.....	11	10	9	8	7	6	5
Capacity, cc.....	20	50	120	190	280	525	870
Diameter, mm.....	65	83	110	123	135	165	190
Each.....	.18	.20	.35	.40	.60	.85	1.20
Number.....	4	3	2	1	0	00	000
Capacity, cc.....	1100	1700	2250	3750	4750	6200	8700
Diameter, mm.....	220	250	275	300	340	365	400
Each.....	1.45	1.70	2.10	2.75	4.00	6.00	6.50

26044. Dish, Alundum, for incinerations, 45 mm diameter at top, 30 mm diameter at bottom, 22 mm high, with wall 2 mm thick. These are furnished in either RA 84 or RA 320 mixture, which should be specified in ordering.

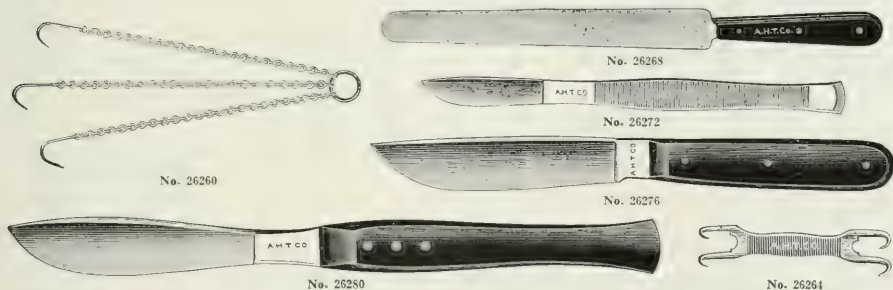






### DISSECTING INSTRUMENTS

26200.	Blowpipe, for zoological work, of nickeled metal, 5 inches long.....	.15
26204.	Forceps, Artery, of nickeled steel, bent form, self-closing, with corrugated points, 55 mm long.....	.40
26208.	Forceps, Artery, same as No. 26204 but straight.....	.40
26212.	" Bone-Cutting, strong straight blades, with pinless lock joint permitting separation for cleaning.	
	Length, mm.....	200 225
	Each.....	2.50 2.75
26216.	Forceps, Bone-Cutting, of nickeled steel, with strong curved blades, 125 mm long.....	.80
26220.	" Dissecting fine, straight, smooth points, 95 mm long.....	.20
26224.	" " curved, with fine file-cut points and guide pin, 120 mm long.....	.35
26228.	" " of steel, heavy, with straight, blunt, corrugated points, 110 mm long.....	.15
26232.	Forceps, Dissecting, with fine straight corrugated points, 115 mm long.....	.40
26236.	" " " curved " 110 mm ".....	.40
26240.	" " " medium fine, straight corrugated points, 115 mm long.....	.40
26244.	" " " curved " 110 mm ".....	.40
26248.	" " " heavy, straight, corrugated points. Length, mm. 105 115 130.....	.145
	Each.....	.40 .40 .40 .40
26252.	Forceps, Dissecting, heavy, straight, corrugated points; without guide pin; 125 mm long.....	.40
26256.	Forceps, Dissecting, heavy, with curved corrugated points, 115 mm long.....	.60

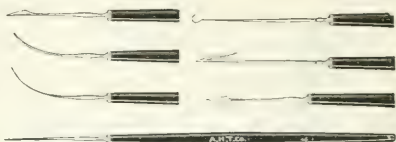


26260.	Hooks and Chains, nickel plated, with sharp points.....	.20
26264.	Double Hooks, of steel, nickel plated.....	.25
26268.	Knife, Brain, with very thin blade of finest steel, in ebony handle. Length of blade 185 mm, width 26 mm.....	1.50
26272.	Knife, Cartilage, all steel, with nickel plated handle, with 45 mm cutting edge.....	.30
26276.	" (Prosecting Knife), with ebony handle and heavy blade thick at the back.	
	Length of cutting edge, mm.....	70 90
	Each.....	.75 1.00
26280.	Knife, Virchow, 3½ inches length of cutting edge.....	1.50





No. 26284

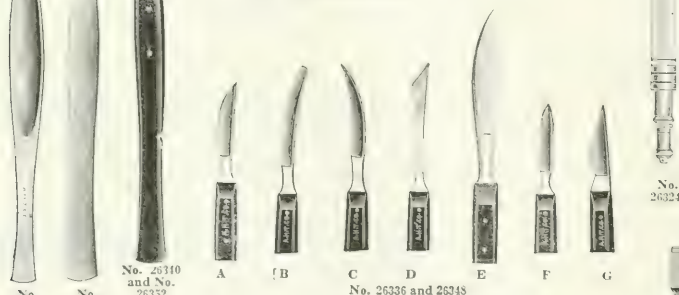


No. 26288 to No. 26312

26284.	Bone Saw, of steel, nickel plated, with detachable blade for sterilization. Length of blade 200 mm.	3.00
26288.	Needle, Dissecting, with ebony handle, straight and sharp, 135 mm long.	.30
26292.	" " " " " curved and sharp, 130 mm long.	.35
26296.	" " " " " blunt, 130 mm long.	.35
26300.	" " " " " half spear shaped, 130 mm long.	.35
26304.	" " " " " spear shaped, with double cutting edge, 125 mm long.	.35
26308.	" " " " " harpoon shaped, with two cutting edges and 145 mm long.	.60
26312.	" " " " " hook shaped, 145 mm long.	.35
26316.	Dissecting Needle, cheap form straight, in cedar wood handle. Per dozen.	.30
26320.	" " " " bent " " " Per dozen.	.30
26324.	Needle Holders, of bone with clamp holding any needle. With one straight needle.	
	Length, mm.	.85 110
	Each.	.07 .10
26328.	Needles, for Holder No. 26324, of steel, 50 mm long. Style.	A B C D
	Per ten.	.05 .07 .05 .05
26332.	Oil Stone, for sharpening scalpels, 4 inches long.	.60

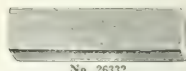


No. 26310 and No. 26312


A B C D  
No. 26328


No. 26324

No. 26320



No. 26332

# SCALPELS, DISSECTING, are carried in the following grades:—

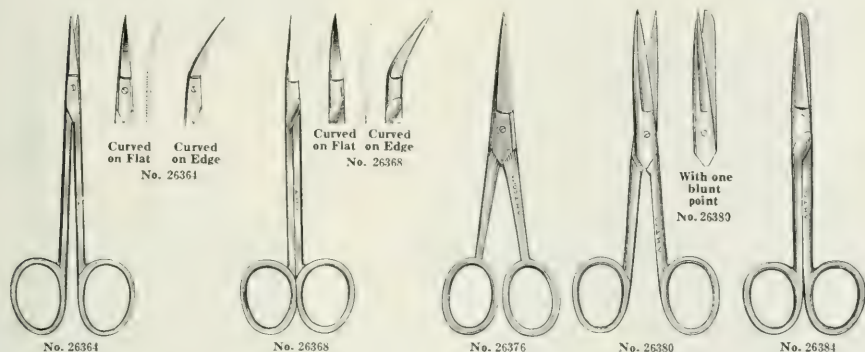
Quality A instruments are of the best attainable quality, being made by the same makers and of the same material as the highest grade minor operating knives.

Quality B instruments are of usual quality for general laboratory work.

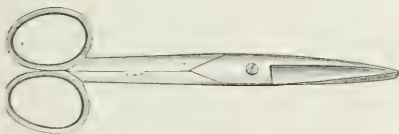
Quality C instruments are entirely suitable for students work where instruments are used for one course in dissecting only but are not recommended for permanent use where they are to be repeatedly resharpened.

26336.	Scalpels, Dissecting, quality A, in ebony handle. Special shapes.						
	Style.	A	B	C	D	E	F
	Length of cutting edge, mm.	35	35	35	10	50	23
	Each.	1.25	1.25	1.25	1.25	1.25	1.25
26340.	Scalpels, Dissecting, quality A, in ebony handle. Regular shapes.						
	Length of cutting edge, mm.	18	25	32	38	45	50
	Each.	1.00	1.00	1.00	1.00	1.00	1.00

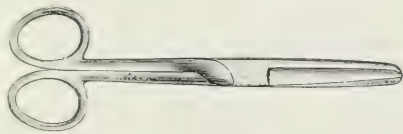
26344.	Scalpels, Dissecting, quality A, all steel. Easily cleaned and sterilized. Regular shapes.						
	Length of cutting edge, mm.....	25	32	38	45		
	Each.....	1.00	1.00	1.00	1.00		
26348.	Scalpels, Dissecting, quality B, with ebony handle. Special shapes.						
	Style.....	A	B	C	D	E	F
	Length of cutting edge, mm.....	35	35	35	10	50	23
	Each.....	.40	.40	.40	.40	.40	.40
26352.	Scalpels, Dissecting, quality B, with ebony handle. Regular shapes.						
	Length of cutting edge, mm.....	18	25	32	38	45	50
	Each.....	.40	.40	.40	.40	.40	.40
26356.	Scalpels, Dissecting, quality B, all steel. Regular shapes.						
	Length of cutting edge, mm.....	25	32	38	45		
	Each.....	.45	.45	.45	.45		
26360.	Scalpels, Dissecting, quality C, with ebony handles. Regular shapes.						
	Length of cutting edge, mm.....	25	32	38	45		
	Each.....	.25	.25	.25	.25		



26364.	Scissors, Dissecting, with fine points and screw joint, length 150 mm; regular quality.			
	Style.....	Straight	Curved on edge	Curved on flat
	Each.....	.50	.75	.75
26368.	Scissors, Dissecting, with fine points and aseptic lock joint, length 150 mm. Finest grade of surgical scissors.			
	Style.....	Straight	Curved on edge	Curved on flat
	Each.....	.90	1.00	1.00
26372.	Scissors, Dissecting, medium weight, with straight points, 150 mm long. A low priced scissors for student work.			
	Each.....	.25		
26376.	Scissors, Dissecting, same size and style as above, but better quality.			
	Each.....	.40		
26380.	Scissors, Dissecting, medium weight, with screw joint, 115 mm long.			
	Style.....	With sharp points	With one blunt point	
	Each.....	.60	.60	
26384.	Scissors, Dissecting, medium weight, with one sharp and one blunt point and aseptic lock joint. Finest grade of surgical scissors.			
	Length, mm.....	105	115	125
	Each.....	.75	.90	1.00

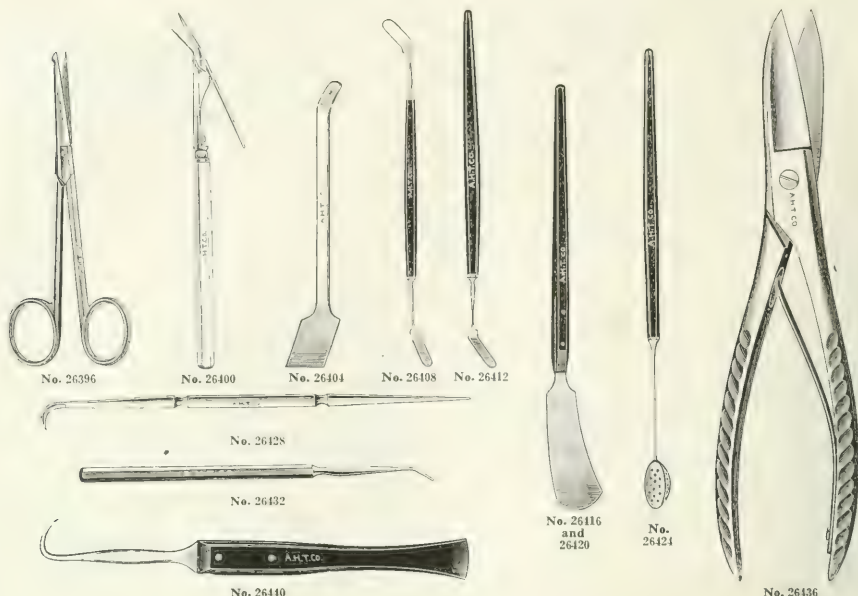


No. 26388



No. 26392

26388.	Scissors, Dissecting, heavy, with one sharp and one blunt point and screw joint.			
	Length, mm.....	125	140	150
	Each.....	.65	.80	.90
26392.	Scissors, Dissecting, heavy, 140 mm long, with both blades blunt and with aseptic lock joint. Finest grade of surgical scissors.			
	Each.....	1.00		

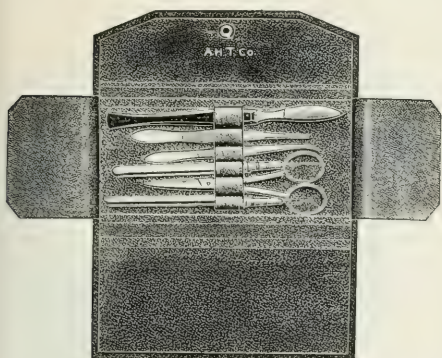


- |        |   |                           |
|--------|---|---------------------------|
| 26396. | Scissors, Dissecting, Coronary Artery, with one probe point. As used in Johns Hopkins University. | 1.25                      |
| 26400. | " " with handle of genuine ivory, for the finest invertebrate dissecting. Length of blades 10 mm. | 3.00                      |
| 26404. | Section Lifter, nickel plated. Total length 100 mm, width 18 mm.                                  | .10                       |
| 26408. | " " with ebony handle. Width of small blade 6 mm, width of larger blade 10 mm.                    | .50                       |
| 26412. | " " similar to No. 26408 but with only one blade. Width of blade 6 mm.                            | .35                       |
| 26416. | " " with ebony handle and very flexible blades. Width of blade 20 mm.                             | .35                       |
| 26420. | " " same as No. 26416 but width of blade 35 mm.   | .40                       |
| 26424. | " " perforated, for handling delicate specimens. Width of top 18 mm.                              | .50                       |
| 26428. | Seeker, or Probe, with the curved end sharply pointed with an inner sharp edge                    | .20                       |
| 26432. | " " Mall form. As used in Johns Hopkins Medical School.   | .40                       |
| 26436. | Carilagen Shears, of nickeled steel. Total length 230 mm, length of blades, 60 mm.                | 2.25                      |
| 26440. | Tenaculum, of steel, with ebony handle and sharp hook. Length 160 mm.                             | .25                       |
| 26444. | " all steel, 160 mm long.   | .40                       |
| 26448. | Dissecting Instrument Cases, in the following styles:—  |                           |
|        | Type A—one fold leatherette case with cloth lining.   |                           |
|        | Type B—two fold leatherette case with cloth lining.   |                           |
|        | Type C—two fold genuine morocco leather case with velvet lining, and chamois protecting flaps.    |                           |
|        | Type D—three fold genuine morocco leather case with velvet lining and chamois protecting flaps.   |                           |
|        | Type.....   | A      B      C      D    |
|        | Each.....   | .25    .50    .90    1.25 |

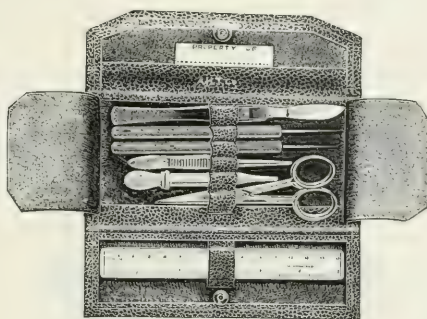
**DISSECTING INSTRUMENTS IN SETS.** The following sets have been prepared as being those mostly in demand. We also make up special sets, utilizing, if possible, the standard types of cases as listed above, and in accordance with the requirements of the practice in vogue in any laboratory.

- |        |  |   |   |   |   |   |
|--------|--|---|---|---|---|---|
| 26452. | Dissecting Set, consisting of one-fold leatherette case with name card inserted and one forceps, one scalpel, two needles, one scissors, one rule and one pipette. | 1 No. 26359. Scalpel, with ebony handle and 38 mm edge.     | 1 No. 26372. Scissors, medium straight.                     | 1 No. 26224. Forceps, fine, curved points.                  | 1 No. 26324. Needle Holders, fitted with needles.           | 1 No. 31100. Celluloid Measure (not shown in illustration.) |
| 26456. | Dissecting Set, consisting of the following instruments in leatherette case No. 26448 Type A....   | 1 No. 26223. Forceps, blunt.                                |   |   |   |   |
| 26460. | Dissecting Set, consisting of the following instruments in leatherette case No. 26448 Type B....   | 1 No. 26360. Scalpel, with ebony handle and 45 mm edge.     | 1 No. 26372. Scissors, medium, straight.                    | 1 No. 26272. Cartilage Knife, all steel, with 45 mm edge.   | 1 No. 26260. Triple Chain and Hooks.                        | 1 No. 26200. Celluloid Measure (not shown in illustration.) |
|        |  | 1 No. 26360. Scalpel, with ebony handle and 45 mm edge.     | 1 No. 26272. Cartilage Knife, all steel, with 45 mm edge.   | 1 No. 26260. Triple Chain and Hooks.                        | 1 No. 26200. Celluloid Measure (not shown in illustration.) |   |
|        |  | 1 No. 26372. Scissors, medium, straight.                    | 1 No. 26272. Cartilage Knife, all steel, with 45 mm edge.   | 1 No. 26260. Triple Chain and Hooks.                        | 1 No. 26200. Celluloid Measure (not shown in illustration.) |   |
|        |  | 1 No. 26252. Forceps, heavy, straight, for vertebrate work. | 1 No. 26252. Forceps, heavy, straight, for vertebrate work. | 1 No. 26252. Forceps, heavy, straight, for vertebrate work. | 1 No. 26252. Forceps, heavy, straight, for vertebrate work. |   |
|        |  | 1 No. 26340. Tenaculum.                                     | 1 No. 26340. Tenaculum.                                     | 1 No. 26340. Tenaculum.                                     | 1 No. 26340. Tenaculum.                                     |   |

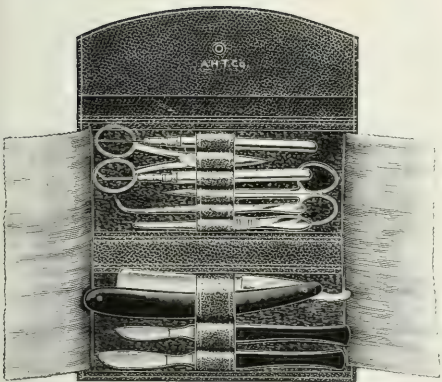




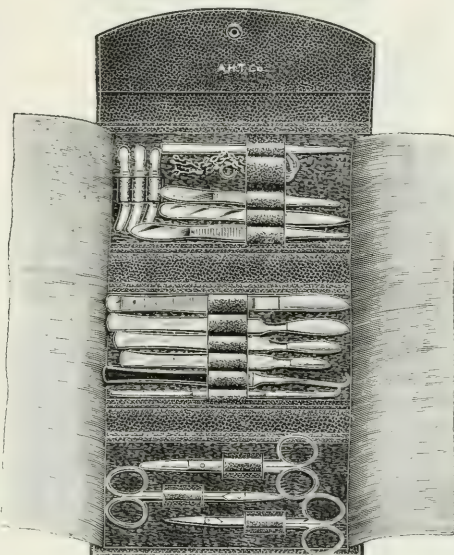
No. 26456



No. 26452



No. 26461



No. 26472

- 26464. Dissecting Set**, consisting of the following instruments in two-fold leatherette case No. 26448 Type B. . . . . 3.25
- |   |   |
|---|---|
| 1 No. 26360. Scalpel, with ebony handle and 45 mm edge. | 1 No. 26228. Forceps, medium, blunt points.                   |
| 1 No. 26360. " " " 25 mm "                              | 2 No. 26324. Needle Holders, 85 mm long, fitted with needles. |
| 1 No. 26364. Scissors, fine, straight.                  | 1 No. 33788. Section Razor, with folding handle               |
| 1 No. 26372. " " " medium, straight.                    | 1 No. 31100. Celluloid Measure (not shown in illustration.)   |
| 1 No. 26224. Forceps, fine, curved points.              |   |
- 26468. Dissecting Set**, consisting of the following instruments in two-fold morocco case, with velvet lining and chamois protecting flaps, No. 26448, Type C. . . . . 3.50
- |  |   |
|--|---|
| 1 No. 26352. Scalpel, with ebony handle and 45 mm edge.    | 1 No. 26272. Cartilage Knife, all steel, with 45 mm edge.   |
| 1 No. 26332. " " " 25 " "                                  | 1 No. 26428. Seeker.  |
| 1 No. 26376. Scissors, medium, straight, nicked.           | 1 No. 26260. Triple Chain and Hook.                         |
| 1 No. 26252. Forceps, heavy straight, for vertebrate work. | 1 No. 26290. Blowpipe.                                      |
| 1 No. 26440. Tenaculum.                                    | 1 No. 31100. Celluloid Measure (not shown in illustration.) |
- 26472. Dissecting Set**, consisting of the following instruments in three-fold morocco case with velvet lining and chamois protecting flaps, No. 26448 Type D. . . . . 8.00
- |  |   |
|--|---|
| 1 No. 26356. Scalpel, all steel, with 45 mm edge.        | 1 No. 26232. Forceps, for vertebrate work.                  |
| 1 No. 26356. " " " 32 mm "                               | 1 No. 26272. Cartilage Knife, all steel, 45 mm edge.        |
| 1 No. 26356. " " " 25 " "                                | 1 No. 26441. Tenaculum.                                     |
| 1 No. 26364. Scissors, fine, straight, nicked.           | 1 No. 26428. Seeker.  |
| 1 No. 26364. " " " curved.                               | 1 No. 26260. Triple Chain and Hooks.                        |
| 1 No. 26360. " " " medium, straight, probe point.        | 1 No. 26290. Blowpipe.                                      |
| 1 No. 26248. " " " medium, heavy, straight, 115 mm long. | 3 No. 26294. Serranines (Artery Forceps.)                   |
| 1 No. 26248. Forceps, heavy, straight, 130 mm long.      | 1 No. 31100. Celluloid Measure (not shown in illustration.) |



# STOKES AUTOMATIC WATER STILLS

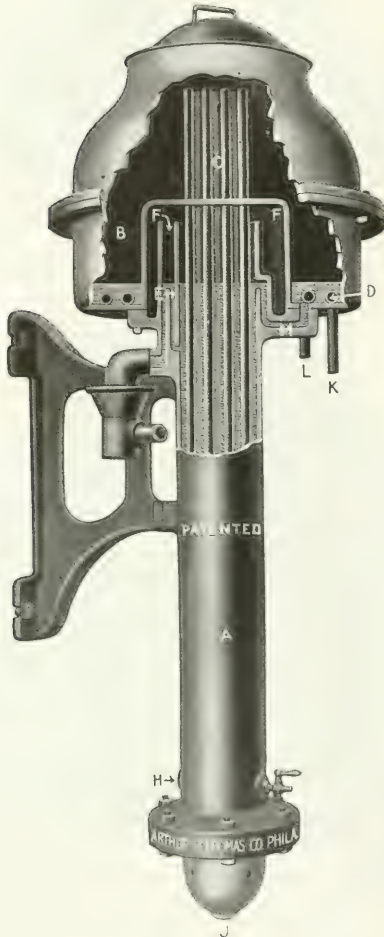


Diagram showing sectional view of the interior of the still and connections

These Stills are of the bracket type, as this arrangement offers the greatest economy of space and is more sanitary than mounting them on floor stands.

The cost of producing distilled water with the steam apparatus under ordinary conditions is one-fifth to one-quarter of a cent a gallon; this includes the cost of both the steam and water required. The quantity of raw water required to produce each gallon of distilled water depends on the temperature at which the distilled water is delivered by the Still. Under average conditions it requires about eleven gallons of raw water to produce one gallon of distilled.

As these Stills are self-contained and require only the two connections for water and steam, they can be installed at very small expense. They are shipped set up ready for connecting the steam and water.

The capacity of the steam Stills is based on having live steam of 20 to 40 pounds pressure at the Still

By a patented construction the Stokes Automatic Still accomplishes two novel results. First—It utilizes the heat generated in the Still for preheating the incoming raw water to the boiling point. By this arrangement a very small quantity of live steam is required to operate the Still after it is once started. Secondly—By preheating the feed water before it enters the distilling chamber, ammonia and other gases, due to impurities in the raw water, are largely liberated and escape into the atmosphere through an opening in the condenser provided for this purpose. This is a very important feature, for by driving off these gases before the water enters the distilling chamber it prevents their reabsorption by the distilled water.

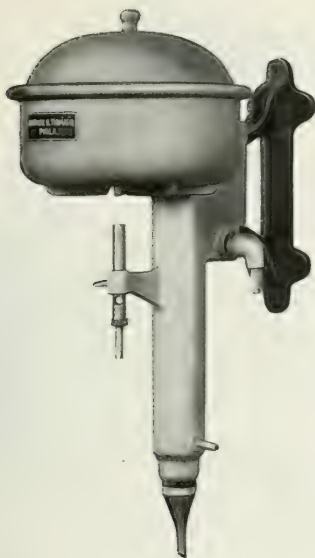
The Stokes Automatic Stills are made in five sizes; the smallest, No. 0 and No. 00 are heated by gas, gasoline burner or steam coil, and the other sizes, Nos. 1 to 4 are heated with live steam. The principle upon which they operate is as follows: The feed or raw water enters at (H) surrounds the condenser tubes (C) and serves first to condense the steam generated in the Still (B) as it descends the condenser tubes, converting it into distilled water; in so doing the raw water becomes heated to the boiling point by the time it reaches the top of the condenser where the ammonia and other gases escape into the air through the opening (F). A part of this feed water escapes over the goose-neck (E), either into a waste pipe or cistern, and the balance passes into the Still through the passage (M).

By referring to the illustration, it will be seen there is a zone of water at the top of the condenser, which being above the outlet to the overflow (G), is not drawn off except to replenish the water in the Still as it evaporates. This zone of water at the top of the condenser is constantly kept boiling by the steam from the Still descending the condenser tubes, and it is here the ammonia and other gases are liberated. The Still is heated by live steam with a pressure of twenty pounds or over, which circulates in the copper coil (D), and serves to boil or evaporate the raw water. The distilled water comes out at (J) and can be piped to any receptacle. The condenser tubes extend to the extreme top of the steam chamber and high above the water level, so there is no danger of water being carried over by steam. The Still can be flushed for cleaning by opening a valve connecting with the drain, or by removing the copper lid on top, the interior can be easily scrubbed.

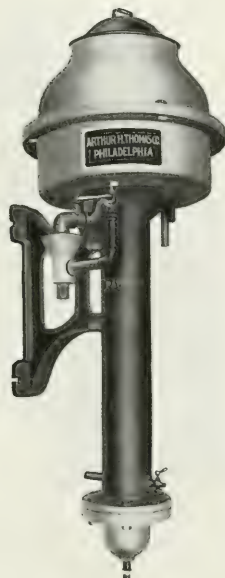
The heating coil is made of copper and will stand a steam pressure of 250 pounds. It is so arranged that it can be detached from the Still for cleaning. This is a very important feature, for scale will form rapidly on any heating surface where hard water is being distilled and unless the Still is constructed so this scale can be removed quickly the Still soon loses efficiency and ceases to operate properly.

The condenser cylinder and distilling chamber are cast iron, the latter galvanized to resist corrosion. The condenser tubes are brass, lined both inside and out with block tin. These are held with screw ferrules so the tubes can be removed if occasion should demand. The manhole cover on the top is copper, tin lined.

The capacity of the steam Stills is based on having live steam of 20 to 40 pounds pressure at the Still



No. 0 Still  
Capacity  $\frac{1}{2}$  gallon per hour



No. 2 Still  
Capacity 10 gallons per hour

We guarantee these Stills to have the capacities stated above and to deliver pure water, free from any contamination. We will ship them on 30 days' approval to any one in the United States where satisfactory reference is furnished.

We supply copper tin-lined or glass-lined steel tanks for storing the distilled water in any capacity up to 1000 gallons.

26500.	Distilling Apparatus, Stokes Automatic, Gas Heating; height 24 inches weight 35 lbs.			
	Size.....	0	00	000
	Capacity per hour, gallons.....	$\frac{1}{2}$	1	3
	Each.....	18.00	20.00	35.00
26504.	Distilling Apparatus, Stokes Automatic, same as No. 00 of No. 26500 but with steam coil inside of boiling chamber, capacity 1 gallon per hour.....			25.00
26508.	Distilling Apparatus, Stokes Automatic, same as No. 26500, equipped with 1 gallon gasoline storage tank, connecting iron piping and gasoline burner; with tank arranged to hang on the wall alongside of the still. The burner for the $\frac{1}{2}$ gallon size consumes one gallon of gasoline in ten hours. Capacity per hour, gallons.....		$\frac{1}{2}$	1
	Each.....		25.00	27.00
26512.	Distilling Apparatus, Stokes Automatic, Steam Heating.			
	Size.....	1	2	3
	Capacity per hour, gallons.....	5	10	25
	Weight, lbs.....	275	325	750
	Height, feet.....	3 $\frac{1}{2}$	4 $\frac{1}{2}$	7
	Each.....	100.00	150.00	250.00
			450.00	600.00

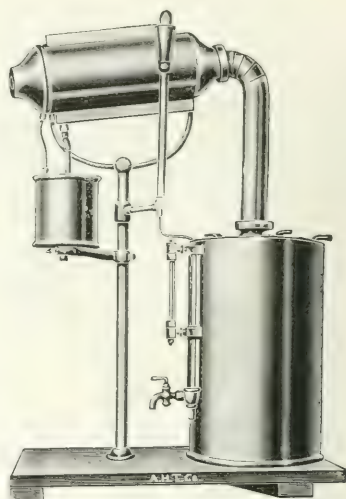
Among those using STOKES AUTOMATIC WATER STILLS, are the following:

Kellogg Food Company  
International Creosoting Company  
Diamond Rubber Company  
Keystone Watch Case Company  
Alan Wood Iron & Steel Company  
Republic Iron and Steel Company  
Pennsylvania Steel Company  
American Can Company  
New Jersey Zinc Company  
Pennsylvania Salt Manufacturing Company  
E. I. du Pont de Nemours Powder Company  
Philadelphia & Reading Railway Company

Texas State College of Agricultural & Mechanic Arts  
University of Washington  
University of Missouri  
Virginia Polytechnic Institute  
Indiana State University  
University of Cincinnati  
Pennsylvania State College  
Battle Creek Sanitarium  
New York State Hospital for the Insane (Matteawan)  
German Hospital (Philadelphia)  
U. S. Department of Agriculture  
U. S. War Department

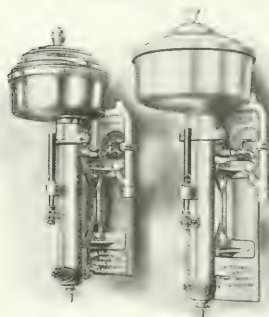


No. 26516

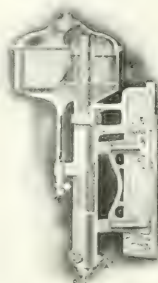


No. 26524

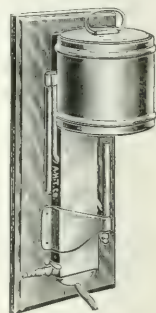
26516. Distilling Apparatus, Barnstead Automatic, Type G, for Gas Heating, yielding chemically pure distilled water without ammonia, gases, or organic impurities; substantially built of copper, nickel plated. Capacity per hour, gallons.....
- |           |       |       |       |               |
|-----------|-------|-------|-------|---------------|
| 1         | 1½    | 2     | 5     | 10            |
| Each..... | 45.00 | 50.00 | 75.00 | 125.00 225.00 |
26520. Distilling Apparatus, Barnstead Automatic, Type E, for Electric Heating, capacity 1 gallon per hour. Current.....
- |           |             |
|-----------|-------------|
| 110 volts | 220 volts   |
| Each..... | 55.00 65.00 |
26524. Distilling Apparatus, Barnstead Automatic, Type S, for Steam Heating; of heavy copper and composition, thoroughly coated with pure block tin on all parts that come in contact with the water. Capacity per hour, gallons.....
- |           |       |        |        |        |        |        |               |
|-----------|-------|--------|--------|--------|--------|--------|---------------|
| 2         | 5-7   | 10-15  | 15-20  | 20-25  | 25-30  | 50     | 75            |
| Each..... | 75.00 | 115.00 | 170.00 | 285.00 | 300.00 | 430.00 | 540.00 775.00 |



No. 26528

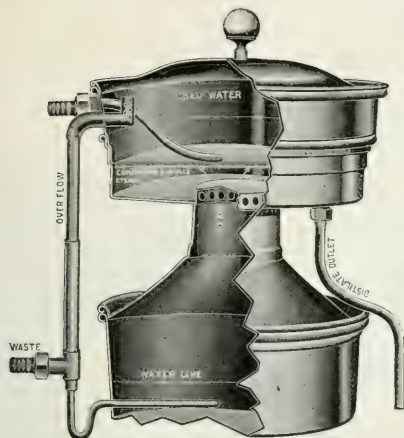


No. 26528

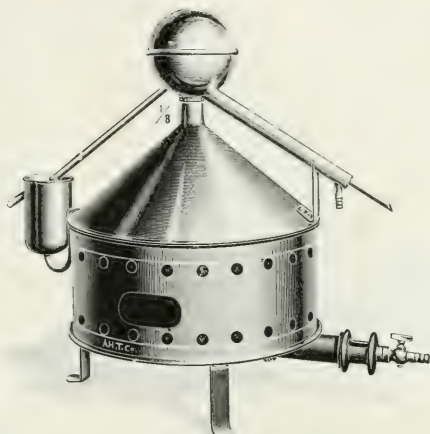


No. 26532

26528. Distilling Apparatus, Jewell, for use with gas; highly recommended for their simplicity and durability; substantially built and all parts easily accessible; boiling chamber is of iron, enamelled inside and finished outside with aluminum bronze paint; condenser of iron. Can be furnished on order with copper boiling chamber, nickel plated outside and tinned inside. Capacity per hour, gallons.....
- |           |       |             |
|-----------|-------|-------------|
| ½         | 1     | 1½          |
| Each..... | 25.00 | 45.00 65.00 |
26532. Distilling Apparatus, Automatic, for gas. Of cold rolled copper, lined throughout with block tin, with top of retort removable for cleaning. Capacity per hour, liters.....
- |           |             |
|-----------|-------------|
| 2         | 4           |
| Each..... | 15.00 25.00 |

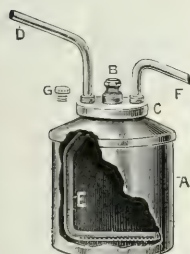


No. 26536

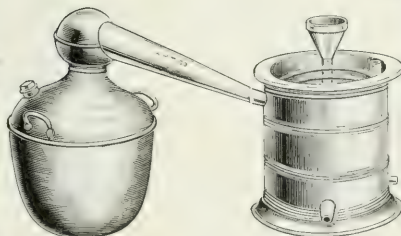


No. 26540

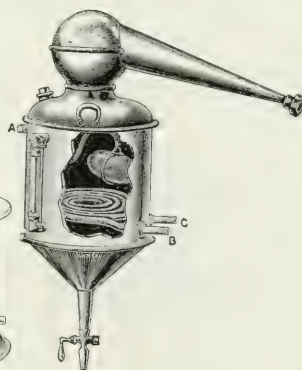
26536. Distilling Apparatus, Automatic, 11 inches in diameter by 13 inches high, made of heavy spun copper without soldered seams; capacity 2 liters per hour with a burner using 10 cu. ft. of gas per hour..... 15.00  
 Iron Tripod, for use with above still..... 1.00
26540. Distilling Apparatus, Femel, Patented, capacity 5 liters per hour; delivers absolutely pure and sterile distilled water. Highly recommended and widely used in Germany.  
 Duty Free..... 42.50      Stock..... 60.00



No. 26544



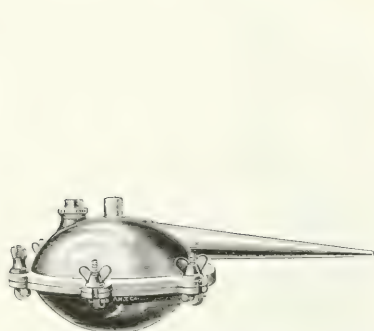
No. 26548



No. 26552

26544. Distilling Apparatus, for steam, designed for experimental distillation of heavy oils and other liquids or solids requiring agitation with high heat.  
 Capacity, gallons..... 1/2      1      2      3      5  
 Each..... 13.75      24.00      36.00      42.00      54.00
26548. Distilling Apparatus, consisting of a tin-lined copper retort with zinc condenser with block tin worm, receiving funnel for cold water and outlet for hot water.  
 Capacity, gallons..... 1/2      1      2      3      5  
 Each..... 12.00      14.00      18.00      23.50      32.00
- Note—For condenser only see No. 25048 and for retort only see No. 46012.
26552. Distilling Apparatus, Automatic, for making distilled water by steam heat; of heavy copper with steam coil near the bottom and provided with an automatic valve which controls the water supply; also water gauge and union for connecting with condenser No. 25048 or other form.  
 Capacity, gallons..... 3      5  
 Each..... 29.25      32.25

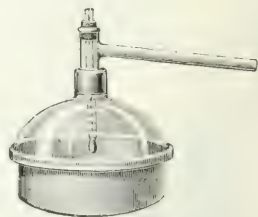




No. 26556

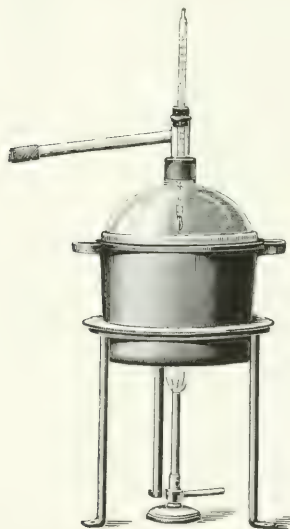


No. 26560



No. 26564

26556. **Distilling Apparatus**, of heavy copper, all seams brazed, intended for high temperatures; with flanges secured by six thumb screw clamps, easily taken apart for cleaning.  
Capacity, gallons.....  $\frac{1}{2}$  1 2 3
- Each..... 23.25 25.50 36.75 51.00
26560. **Distilling Apparatus, for Determination of Ammonia in Water.** The inlet tube permits the introduction of the permanganate solution into the flask after the distillation of the free ammonia; with mercury seal providing a perfect joint and easy disconnection..... 7.00
26564. **Distilling Apparatus, Vacuum**, for evaporations or distillations under diminished pressure. Consisting of a porcelain dish 160 x 80 mm, 2 liters capacity, glass dome with tubulation for thermometer and side tube, and rubber fitting between dome and porcelain dish. Without thermometer.. 7.50



No. 26568

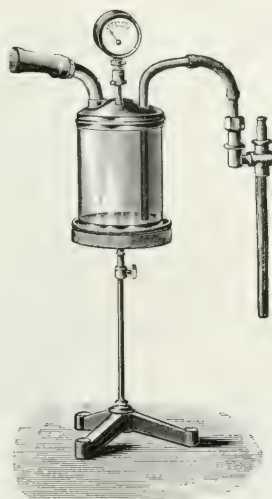


No. 26584

26568. **Distilling Apparatus, Vacuum**, with cast iron water bath, white enamelled inside, and tripod, but without burner or thermometer..... 10.00
26572. **Porcelain Dish only**, 160 x 80 mm, 2 liters capacity, for either No. 26564 or No. 26568..... 5.00
26576. **Glass Dome, only**..... 1.75
26580. **Rubber Ring, only**..... 1.00
26584. **Distilling Apparatus, Vacuum**, consisting of copper water bath with stopcock, on tripod, porcelain dish with glass dome fitted air-tight by means of gasket and glass side tube for side of dome, but without thermometer.
- Capacity of porcelain dish, liters.....  $1\frac{1}{2}$  2 $\frac{1}{2}$
- Each..... 22.50 30.00

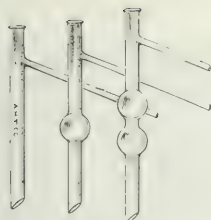


No. 26588

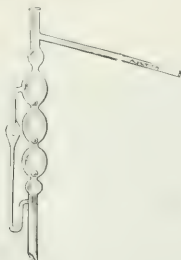


No. 26608

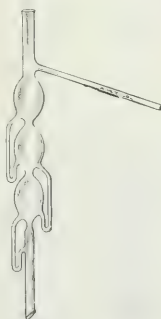
26588.	Distilling Apparatus, Vacuum, same as No. 26584, arranged for distillations but with the addition of vacuum pump, condenser, gauge and glass bottle.		
	Capacity of porcelain dish, liters.....	1½	2½
	Duty Free.....	28.05	36.30
	Stock.....	42.50	55.00
26592.	Porcelain Dish only, with tin ring.....	7.50	10.05
26596.	Glass Dome, only.....	3.00	4.20
26600.	Glass Side Tube, only.....	.45	.60
26604.	Rubber Rings, only.....	.85	1.40
26608.	Glass Reservoir with metal top, with tubulations, gauge, filter pump and stand. For use with No. 26584 in place of gauge, condenser, etc., as listed under No. 26588.		
	Duty Free.....	7.50	11.25
	Stock.....		



No. 26612-16-20

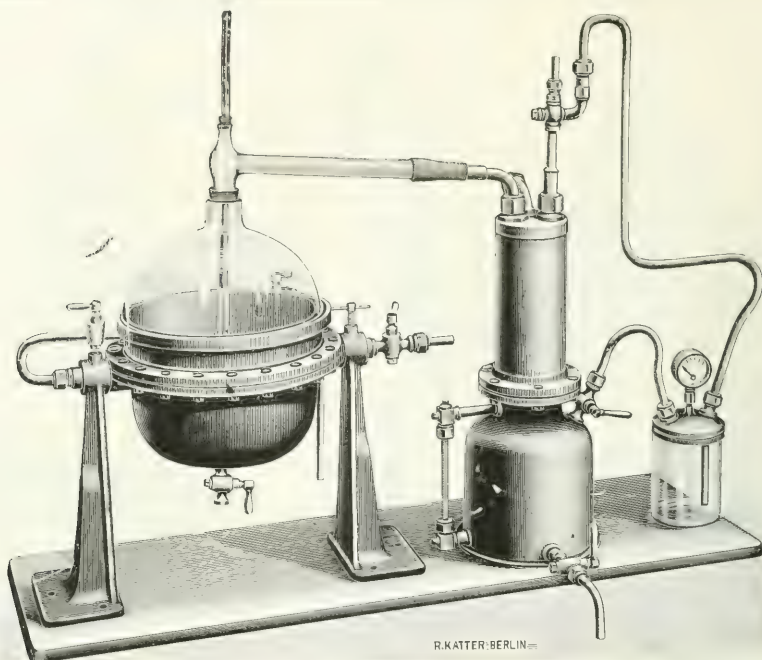


No. 26624



No. 26632

26612.	Distilling Tube, plain form, for fractional distillation.....			.15
26616.	" " " with one bulb.....			.20
26620.	" " " two bulbs.....			.25
26624.	" " " Glinsky, with glass valves.			
	Length, mm.....	400	425	460
	Each.....	1.50	2.00	2.50
26628.	Distilling Tube, Le Bel-Henninger, with two bulbs.....			1.00
26632.	" " " three " ".....			1.25
26636.	" " " four " ".....			1.80



No. 26640

26640. Distilling Apparatus, Vacuum, consisting of metal retort heavily tinned inside, with steam jacket and stopcock, with drip cup, stopcock for live steam connection, glass dome, copper condenser with block tin tube and filter pump, and glass overflow reservoir with metal top and pressure gauge. Very stoutly built for heavy work.
- |                                    |        |        |
|------------------------------------|--------|--------|
| Capacity of metal pan, liters..... | 7      | 12     |
| Duty Free.....                     | 95.70  | 108.90 |
| Duty Paid.....                     | 145.00 | 165.00 |
26644. Porcelain Dishes to fit inside of copper retort of No. 26640.
- |   |       |       |
|---|-------|-------|
| Capacity of porcelain dish, liters..... | 5     | 9     |
| To fit retort, liters.....              | 7     | 12    |
| Duty Free.....                          | 9.10  | 12.90 |
| Duty Paid.....                          | 16.50 | 23.40 |

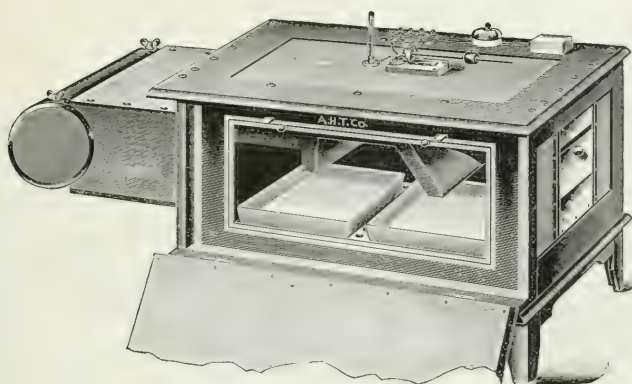
Note—Pure nickel dishes can also be fitted inside of the copper retort. Price on application.



View in Office



View in Office



No. 26648—For two trays

**26648. Drying Apparatus, Hearson,** for serums and other sensitive and easily decomposed liquids. This apparatus works without vacuum and renders possible the rapid, safe and antiseptic drying of the most delicate liquids at a low temperature. Two liters of serum can be dried in from six to eight hours which, with a large vacuum apparatus as formerly used, required at least 24 hours. The intake of air is filtered through a flannel filter and, after passing through the heating chamber, reaches the drying compartment in which are placed the trays containing the liquid to be dried. The warm air, after having become charged with moisture from the contents of the trays, passes out of the apparatus. Baffle plates insure the direct passage of the current of air over the trays. For most work a temperature of 25 to 30° C. is maintained in the warming chamber, temperature of which may be noted by reading the thermometer. The apparatus is provided for either gas or electric heating as may be specified but for most work we recommend that electric heating be used both for heating the chamber and operating the motor by means of a resistance on the same circuit which makes it impossible for the heating or the motor to operate alone. The following experiment shows the antiseptic conditions under which work may be done with this apparatus:—

Two liters of running water 1 cc were set. It grew 25 colonies of which the larger part was washed away. The running water was then divided into the four receptacles of the machine so that 500 cc was in each division. The air ventilator was operated for five hours and the ingoing air warmed with the following result:—

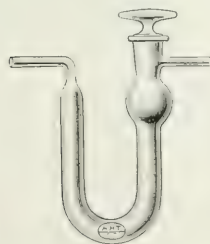
No. 1 Compartment—	Water loss 180 grains—1 dead colony in 1 cc.
No. 2	—123 grains water evaporated—9 large dead colonies in 1 cc.
No. 3	—168 grains water evaporated—2 large dead and 7 living colonies in 1 cc.
No. 4	—123 grains water evaporated—7 large dead and 4 small colonies in 1 cc.

From this experiment it is evident that the germ number of the water by the drying process has not been increased but considerably decreased. In another test sterilized water was used and the air admitted was not warmed. In each compartment 250 cc of sterilized water dried for five hours, after which 1 cc of each tray was tested. All four tests remained free from germs. Number of trays.....

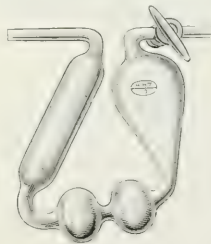
	2	3	4
Duty Free.....	172.50	195.00	225.00
Duty Paid.....	258.75	292.50	337.50



No. 26652



No. 26656



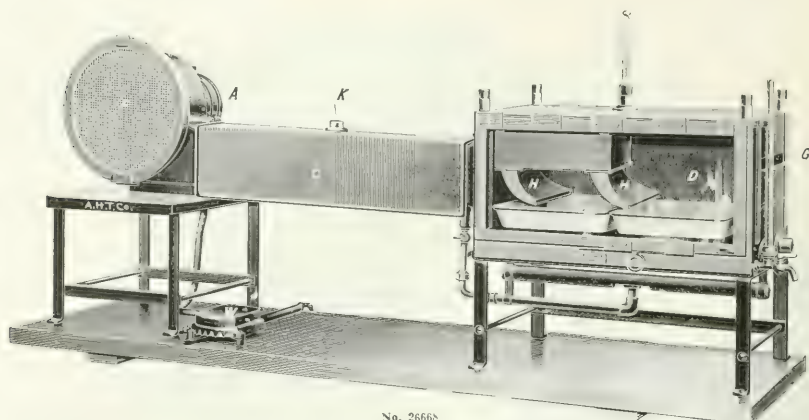
No. 26660



No. 26664

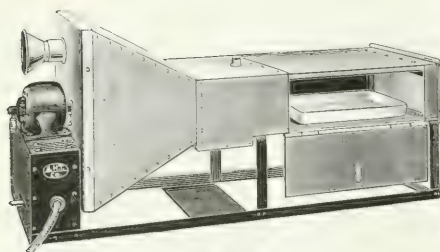
26652.	Drying Tubes, Liebig.....	.30
26656.	" " Vanier, for zinc, being "E" of the Vanier Combustion Train p. 150.....	.75
26660.	" " " sulphuric acid, being "F" of the Vanier Combustion Train p. 150.....	1.25
26664.	" " " Combined Potash Bulb and Drying Tube, being "G" of the Vanier Combustion Train p. 150.....	3.25



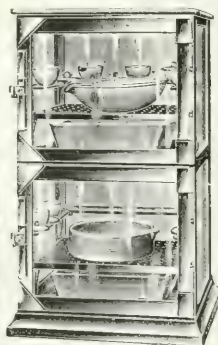


No. 26668

26668. **Drying Apparatus, Faust-Heim**, designed especially for serums and easily decomposed fluids. As furnished by us to leading manufacturers of biological products, Henry Phipps Institute of the University of Pennsylvania, etc. Illustration shows form as made for two dishes. The two larger sizes accommodate three and four dishes, respectively. For gas heating.
- | To take, dishes..... | 2      | 3      | 4      |
|----------------------|--------|--------|--------|
| Duty Free.....       | 196.00 | 216.00 | 245.00 |
| Duty Paid.....       | 237.60 | 261.80 | 297.00 |
26672. **Drying Apparatus Faust-Heim**, same as above but for electric heating. Price includes electric motor. Voltage must be stated in ordering.
- | To take, dishes..... | 2      | 3      | 4      |
|----------------------|--------|--------|--------|
| Duty Free.....       | 208.75 | 236.00 | 272.25 |
| Duty Paid.....       | 253.00 | 286.00 | 330.00 |



No. 26676



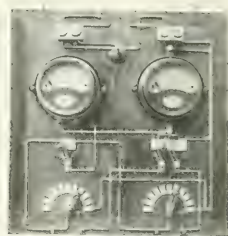
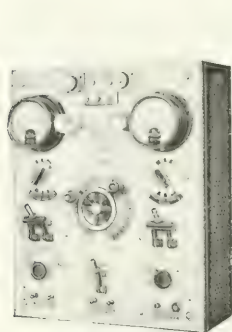
No. 26684



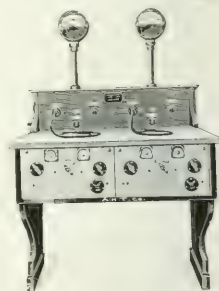
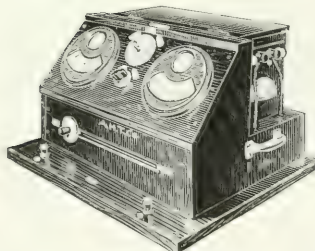
No. 26688

26676. **Drying Apparatus, Buxton and Beebe**, modified by Taylor, for the rapid drying, at low temperatures, of easily decomposed organic products. Of heavy polished copper with motor and burner for heating which is not shown in illustration. Price does not include dish. Voltage must be stated in ordering. 85.00
26680. **Drying Closet**, of glass throughout, with nickel plated brass mountings. Inside dimensions 10 x 12 x 10 inches.
- |                |       |            |       |
|----------------|-------|------------|-------|
| Duty Free..... | 19.20 | Stock..... | 28.80 |
|----------------|-------|------------|-------|
26684. **Drying Closet**, same as No. 26680 but with two compartments and two handles.
- |                |       |            |       |
|----------------|-------|------------|-------|
| Duty Free..... | 32.00 | Stock..... | 48.00 |
|----------------|-------|------------|-------|
26688. **Ebullimeter, Dujardin-Salleron**, original French make, in exact accordance with the official standard of the Arts and Trades Conservatory in Paris, reading in degrees of legal alcoholometer scale and the degrees of Mallingand Ebullioscope. Of polished copper with jacket around the burner, complete in case with accessories and thermometer. 30.00
26689. **Special Thermometer**, for above. 10.00

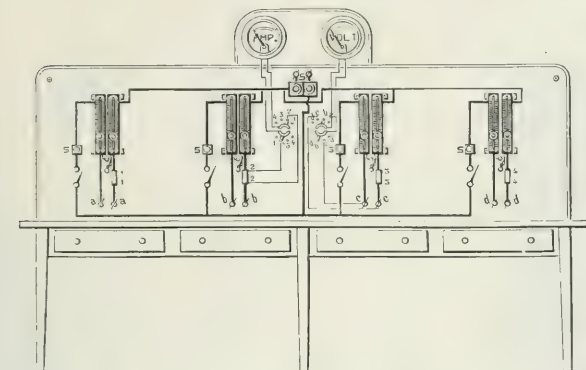




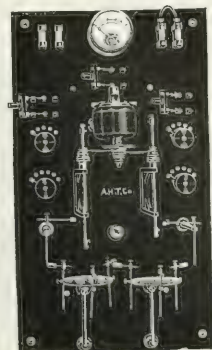
No. 26720 for D. C.		No. 26728 for A. C.		No. 26736	
26720.	Switch Board, Experimental, Model C, for 110 volts direct current, with precision milli-ammeter and voltmeter. Net weight 80 kilograms; size 85 x 70 x 30 cm. Range of meters from 1 milli-ampere to, amperes.....	15	20	30	
	Duty Free.....	110.75	112.50	118.15	
	Duty Paid.....	132.75	135.00	141.75	
26724.	Switch Board, Experimental, Model C, as above, but for 220 volts, direct current. Range of meters from 1 milli-ampere to, amperes.....	15	20	30	
	Duty Free.....	120.00	123.75	129.50	
	Duty Paid.....	144.00	148.50	155.15	
26728.	Switch Board, Experimental, Model C, as above, but for 110 volts alternating current. Range of meters from 1 milli-ampere to, amperes.....	15	20	30	
	Duty Free.....	108.75	110.75	116.25	
	Duty Paid.....	130.50	132.75	139.50	
26732.	Switch Board, Experimental, Model C, as above, but for 220 volts, alternating current. Range of meters from 1 milli-ampere to, amperes.....	15	20	30	
	Duty Free.....	118.15	121.90	127.50	
	Duty Paid.....	141.75	146.25	153.00	
26736.	Switch Board, Portable, for Quantitative Electrolysis, particularly recommended for teaching purposes because all connections are exposed, and not recommended for factory or continuous laboratory work because of the deterioration in connections due to this exposure. On heavy hardwood board arranged to either hang on the wall or stand on the work table. With precision voltmeter and ammeter reading from 0 to 10 volts and 0 to 10 amperes, respectively. Duty Free.....	52.50	Duty Paid.....	63.00	



No. 26740		No. 26748	
26740.	Switch Board, Portable, for Quantitative Electrolysis, similar to No. 26736 but with handles for convenient carrying and particularly recommended for factory and practical laboratory work because of the complete protection against dust and fumes and of the fact that the necessary accumulators may be conveniently placed inside the desk shaped cover. With precision voltmeter and ammeter reading from 0 to 10 volts and 0 to 10 amperes, respectively. With adjustable resistance, all necessary connections, etc., but without accumulators Duty Free.....	70.00	Duty Paid..... 82.50
26748.	Switch Board and Work Table, Classen, for Quantitative Electrolysis, with precision voltmeter reading from 0 to 15 volts in 0.2 volts and precision ammeter reading from 0 to 15 amperes in 0.2 amperes, and, in addition, both current and potential indicators with all necessary connections, resistances, etc., and connections for laboratory supply of gas, water and vacuum systems Number of determinations.....	2	4 6
	Duty Free.....	211.25	330.00 440.00
	Duty Paid.....	256.00	400.00 532.00

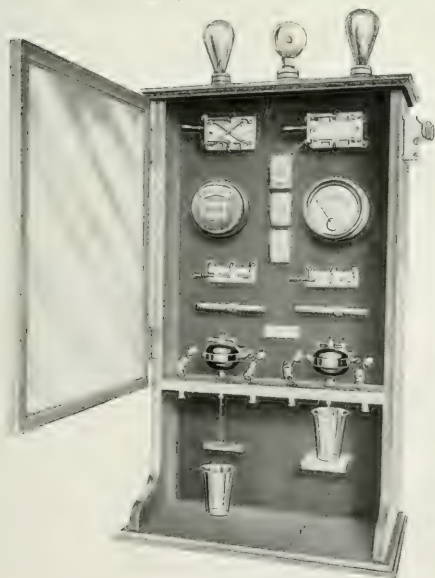


No. 26752



No. 26756

26752. **Switch Board and Work Table for Quantitative Electrolytic Analysis**, for operation with direct current up to 5 amperes per electrolysis and at a voltage of 12 volts. Tables are stoutly made of well finished wood, with resistance, measuring instruments, switch, etc., on the upright switch board behind each table.
- | Number of electrolyses.....  | 2      | 3      | 4      | 6      | 8      |
|------------------------------|--------|--------|--------|--------|--------|
| Amperes, direct current..... | 10     | 15     | 20     | 30     | 40     |
| Duty Free.....               | 109.00 | 122.15 | 135.00 | 231.00 | 254.10 |
| Duty Paid.....               | 130.75 | 146.50 | 162.00 | 277.25 | 305.00 |
26756. **Switch Board, Veit, for Quantitative Electrolytic Analysis**, with two gold plated rotating spindles, the polarity of which is reversible by means of switch; each spindle connected with six point switch, advancing the current from .05 amperes to .5 amperes, and additional switch from 1 ampere to 5 amperes. Ammeter reads from .05 to 5 amperes, with connections so that readings may be taken separately from either spindle. The container support will hold a platinum dish up to 3½ inches in diameter, with platinum contact points to insure good metallic contact when dish is used as either anode or cathode. Complete outfit is mounted on polished slate slab 31 x 18 inches supported by angle-iron braces. This switch board obviously can not be connected with an alternating current unless same is transformed by use of motor generator set..... 100.00
26760. **Switch Board**, same as above but with two revolving spindles..... 150.00



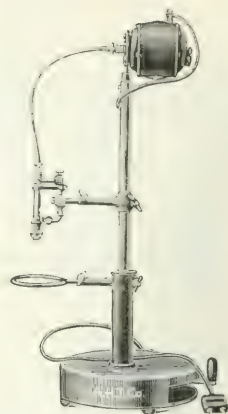
No. 26761

26764. **Electrolytic Outfit, Herman, for Quantitative Copper Analysis, etc.**, with revolving anodes and cathode of platinum gauze. Assays are quickly made. Cabinets are made up of any number of units, each unit having an individual motor so that one or more units may be operated at one time. Can not be used on alternating current excepting with motor generator set. The outfit is neatly mounted in a hardwood case with a glass door, which protects the motors from the nitric acid fumes. Complete in cabinet with voltmeter and ammeter. Platinum electrodes are furnished at the market price of platinum. Approximate weight of anodes, 4.25 grams, cathodes, 9.00 grams.
- | Number of units..... | 1      | 2      |
|----------------------|--------|--------|
| Each.....            | 100.00 | 120.00 |
| Number of units..... | 4      | 6      |
| Each.....            | 165.00 | 220.00 |





No. 26768



No. 26772

26768. **Switch Board, Nissenson, for Quantitative Electrolysis, closet form.** Cabinet is made of polished oak with three counterpoised glass doors (in the outfit for 6 determinations) and two shelves covered with glass plates; each compartment is furnished with precision ammeter and voltmeter, necessary control switches, resistances, etc. Without accumulators.

Number of determinations..... 6 8 10

Duty Free..... 528.00 660.00 792.00

Duty Paid..... 640.00 800.00 960.00

26772. **Electrolytic Support, Fischer, for use with any of the switch-boards or work table outfits previously listed.** With motor and electrode holder for all kinds of electrodes and stirring devices, with regulating rheostat in the base. Current, volts..... 110 d. c. a. c. and 220 d. c.

Duty Free..... 46.25 51.25

Duty Paid..... 56.00 62.00



No. 26776



No. 26780



No. 26784



No. 26788



No. 26792

26776. **Electrolytic Support, Fischer, simplified 1912 model.** Current, volts 110 d. c. a. c. and 220 d. c.

Duty Free..... 30.00 34.65

Duty Paid..... 36.00 42.00

26780. **Electrolytic Support, Fischer-Fresenius, for electrolysis without rotation as in elementary electro-chemistry; with double electrode holders and thermometer holder..... 5.00**

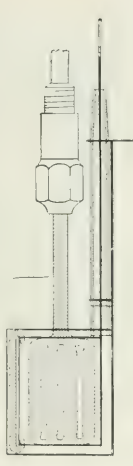
26784. **Electrolytic Support, with japanned iron base, glass upright with ring with three platinum lugs and one clamp, and binding post attached to both ring and clamp..... 5.00**

26788. **Electrolytic Support, same as No. 26784 with two clamps with binding posts..... 4.75**

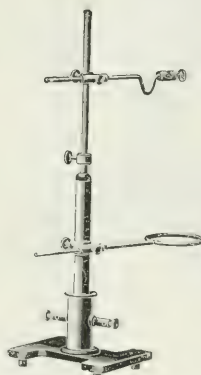
26792. **“ “ with glass upright carrying clamp and separate glass upright carrying ring.. 5.00**



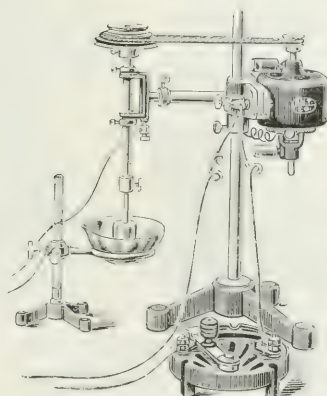
No. 26816



No. 26800 with 26816

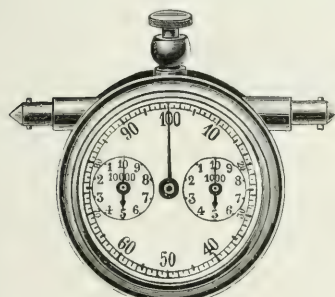


No. 26796

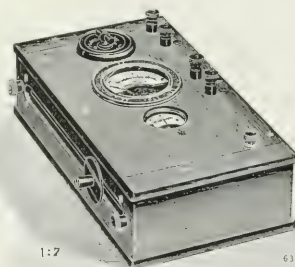


No. 26820

26796. Electrolytic Support, Peters, adjustable as to height and with extension clamp.  
Duty Free..... 6.00 Duty Paid..... 11.00
26800. Glass Stirrer, for Electrolysis, Fischer. Illustration of No. 26772 shows the stirrer attached to the rotating head of the support and in connection with the double net electrode..... 1.50
26808. Connecting Cords for electrolytic support, covered with red and blue silk, respectively, to show polarity, 80 cm long, per pair..... 1.50
26816. Double Net Electrode, Pure Nickel, Fischer..... 10.00  
Note:—For Platinum Electrodes see Platinum Ware.
26820. Electric Stirrer and Rotating Anode Apparatus, consisting of motor which can be furnished for either alternating or direct current, 110 or 220 volts; adjustable arm for holding the anode or stirring rod with suitable attachment for electrolysis current and rheostat for regulating speed from 50 to 1000 revolutions per minute. Recommended for depositing metals in quantitative analysis. Price does not include crucible anode or dish shown in illustration, nor electrolytic stand with glass upright. Please specify voltage and current in ordering..... 25.00

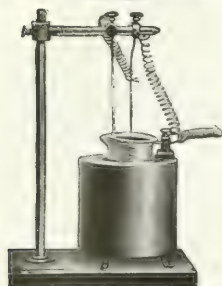


No. 26824

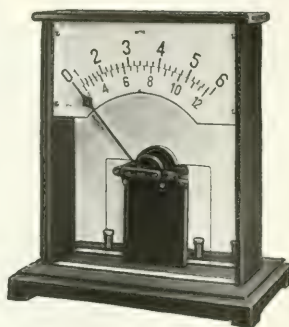


No. 26832

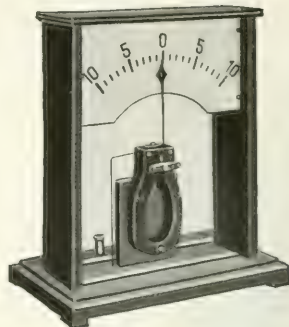
26824. Speed Counter, Fischer, for conveniently determining the speed of the stirring device..... 7.00
26832. Potentiometer (Compensation Apparatus), Fischer; a quick and convenient measurement and check of cathode potentials when determining and separating metals by means of electrolysis. The instrument consists of a rectangular walnut case with a convenient and handy arrangement of the following:—  
A moving coil voltmeter for 0-2.5 volts with divisions of 0.05 volts; a moving coil galvanometer with pointer and scale divided 10-0-10, sensitiveness  $1^\circ = 0.000004$  amperes; a current switch for the auxiliary battery; a key; a sliding resistance and four terminals with suitable connections for battery and electrolysis. The sliding resistance is readily removable for cleaning. See A. Fischer, *Elektroanalytische Schnellmethoden*. Enke, Stuttgart 1908 and A. Fischer, *Chemiker-Zeitung* Cöthen 1909, No. 37, p. 337.  
Duty Free..... 55.50 Duty Paid..... 66.60



No. 26836



No. 26840



No. 26844

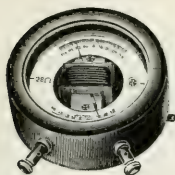
26836. **Apparatus for Rapid Electrolysis in a Magnetic Field**, consisting of a solenoid of insulated copper wire, inside of which is an iron cylinder to strengthen the magnetic field, the entire being covered by an iron mantle which serves to protect the winding and, at the same time, concentrate the lines of force. Connections are provided permitting the use of the same circuit for exciting the solenoid and conducting the electrolysis. The apparatus is intended for a 16 volt direct current circuit but may be conveniently used on regular lighting circuits of 110 or 220 volts direct current with additional resistances. Without electrodes..... 21.00

**GALVANOMETERS, DEMONSTRATION**, designed primarily for lecture table use, with transparent scale graduated on both front and rear so that same is visible to the audience as well as to operator. With case and base of polished mahogany, with glass both front and back. These instruments are convenient for use as Galvanoscopes, i. e., for the indication of the presence and polarity of electric currents, or as Galvanometers as the angle of deflection is proportional to the strength of the current. They are made in two systems, i. e., the electromagnetic or soft iron system with air damping device, and the moving coil or Deprez d'Arsonval system. With the set of resistances and shunts they can be used as volt and ammeters reading from 0 to 250 volts and from 0 to 50 amperes and, in addition, they are offered below in both systems with special scales graduated in both volts and amperes.

	Duty Free	Duty Paid
26840. <b>Galvanometer, Demonstration</b> , with soft iron (electromagnetic) system, as above described.....	13.50	16.25
26844. <b>Galvanometer, Demonstration</b> , with moving coil (Deprez d'Arsonval) system, as above described.....	15.00	18.00
26848. <b>Set of Four Resistances and Three Shunts on Baseboard</b> , for use with above Galvanometers. Can be connected singly with the instruments for measuring voltage from 0 to 1, 0 to 10, 0 to 100 and 0 to 250 volts and current from 0 to 1, 0 to 10 and 0 to 50 amperes.....	12.00	14.40

**DEMONSTRATION VOLT AND AMPERE-METERS**. These consist of the above Galvanometers with special scales reading directly in volts and amperes as indicated.

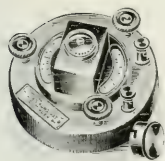
26852. <b>Demonstration Ampere-Meter</b> , with soft iron (electromagnetic) system, for either direct or alternating current, 1 to 60 amperes.....	15.00	18.00
26856. <b>Demonstration Voltmeter</b> , as above, 4 to 100 volts.....	15.00	18.00
26860. " " " " 100 to 250 volts.....	18.00	21.60
26864. " <b>Combined Volt and Ampere-Meter</b> , as above, with scale 0 to 12 volts and 0 to 6 amperes.....	19.50	23.40
<b>Note:</b> —Please state in ordering whether instrument is to be used on direct or alternating current.		
26868. <b>Demonstration Ampere-Meter</b> , with moving coil (Deprez d'Arsonval) system, for direct current only, 0 to 50 amperes.....	16.50	19.80
26872. <b>Demonstration Voltmeter</b> , as above, 0 to 500 volts.....	16.50	19.80
26876. <b>Demonstration Universal Galvanometer</b> , scale 2-0-2 milliamperes, 100-0-100 millivolts, with resistances by which the range is increased to 10 milliamperes, 100 ohms and 1 volt.....	21.00	25.20
26880. <b>Separate Shunts</b> , for above, from 100 millivolts to 50 amperes, each.....	3.60	4.35



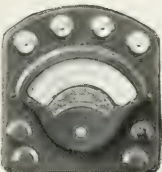
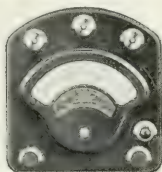
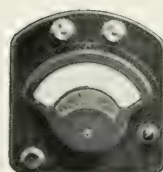
No. 26896



Nos. 26908 to 26910 Showing Various Scales



No. 26900



Nos. 26908 to 26910 Showing Various Scales

26896. Galvanoscope, for Wheatstone Bridge measurements, determination of E. M. F. by means of the compensation method, etc., internal resistance 6 ohms, sensibility .02 milliampere = 1° of scale; diameter 100 mm, height 50 mm..... 8.25
26900. Galvanoscope, Paschen, with internal resistance of 10 ohms, sensibility of .002 milli-ampere = 1° of scale, and with an internal resistance of 6 ohms and a sensibility of .0002 milliampere = 1° of scale. In an iron case for magnetic protection. Sensibility must be specified in ordering.  
Duty Free..... 12.75  
Duty Paid..... 15.30
26904. Galvanoscope, as above, in brass case.  
Duty Free..... 16.35  
Duty Paid..... 19.65

**WESTON MINIATURE PRECISION DIRECT CURRENT AMMETERS, VOLTMETERS AND VOLT-AMMETERS, Model 280.** These instruments embody all the well known advantages of the Weston instruments being absolutely dead beat and extremely sensitive and so designed that they may be left continuously in circuit under full load without overheating or causing an appreciable change in the indications. The separate voltmeters have a resistance of about 100 ohms per volt while the volt-ammeters have a resistance of approximately 50 ohms per volt. The cases are made of sheet steel finished in dead black and the dimensions are 4.6 x 4.4 x 1.5 inches and any of the instruments may be carried in an ordinary coat pocket. A great variety of ranges is offered, i. e., the voltmeters from 50 milli-volts to 150 volts, and the ammeters from 50 milli-amperes to 30 amperes. They are admirably adapted to all kinds of commercial and experimental testing falling within their limits of e. m. f. and current and are very adaptable for individual students use in laboratory work. Particular attention is called to the double and triple scale instruments and the volt-ammeters. The triple range volt-ammeter is in reality six instruments in one case, since there are three current ranges and three e. m. f. ranges. Range must be specified in ordering.

26908.	Single Range Milli-Voltmeters.						
	Milli-volts.....	50	75	100	120	150	200
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50
	Milli-volts.....	250	300	400	500	600	750
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50
26912.	Single Range Voltmeters.						
	Volts.....	1	2	3	5	7.5	15
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50
	Volts.....	25	40	50	75	100	150
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50
26916.	Double Range Voltmeters.						
	Volts. 20-2 20-8 25-2.5 30-3 50-2.5 50-5 80-8 100-10 150-15						
	Each.. 14.50 14.50 14.50 14.50 14.50 14.50 14.50 14.50 14.50						
26920.	Triple Range Voltmeters.						
	Volts.....	25-10-2.5	30-3-1.5	30-6-3	30-15-3	40-20-4	50-5-2.5
	Each.....	16.50	16.50	16.50	16.50	16.50	16.50
	Volts.....	50-25-5	50-25-10	80-20-4	100-25-2.5	150-15-1.5	150-15-3
	Each.....	16.50	16.50	16.50	16.50	16.50	16.50



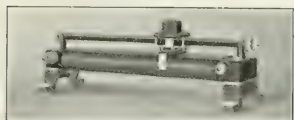
26924.	Single Range Mil-Ammeters.									
	Milli-amperes.....	50	75	100	120	150	200			
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50			
	Milli-amperes.....	250	300	400	500	600	750			
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50			
26928.	Single Range Ammeters.									
	Ampes.....	1	2	3	5	7.5	10	15	25	30
	Each.....	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
26932.	Double Range Ammeters.									
	Ampes.....	1-0-1	2.5-0-2.5	5-0-1	5-0-5	8-2	10-1	15-1.5	20-2	25-2.5
	Each.....	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50
26936.	Triple Range Ammeters.									
	Ampes.....	5-2.5-0-2.5	10-1-0-1	10-1-0-5	10-1-0-5	10-2.5-1	15-3-0-1.5	20-4-2	20-8-2	
	Each.....	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50
	Ampes.....	25-2.5-0-5	25-5-2.5	25-10-2.5	25-10-5	30-3-1.5	30-6-3	30-15-3	15-3-1.5	
	Each.....	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	
26940.	Single Range Volt-Ammeters.									
	Volts.....					1.5	3	3	3	
	Ampes.....					3	1.5	3	15	
	Each.....					19.00	19.00	19.00	19.00	



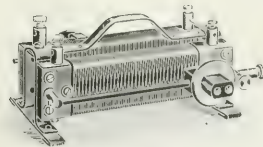
No. 26944

WESTON STANDARD PORTABLE DIRECT CURRENT VOLTMETERS AND AMMETERS. The illustration used shows the general type of the instruments and form of mounting, etc., for all of the Voltmeters, Ammeters, Mil-Ammeters and Milli-Voltmeters listed below.

26944.	Portable Voltmeters.									
	Range, volts.....	150	150	150-5	150-3	150-15	300-150	300	450	600
	Division, volts.....	1	1	$1-\frac{1}{10}$	$1-\frac{1}{10}$	$1-\frac{1}{10}$	2-1	2	3	5
	Each.....	55.00	57.50	75.00	75.00	75.00	77.50	65.00	65.00	65.00
26948.	Portable Milli-Voltmeters.									
	Range, milli-volts.....	0 to 20		10 to 0 to 10		10 to 0 to 10 and	100 to 0 to 100	0 to 20 and	0 to 200	
	Divisions.....	100		100		100	100	100	100	
	Each.....	50.00		50.00		55.00		55.00		
26952.	Portable Mil-Ammeters.									
	Range, mil-amperes...	150	300	600	1000	1500	500 and 50	500 and 10		
	Divisions, mil-amperes	1	2	4	10	10	$5-\frac{1}{2}$	$5-\frac{1}{10}$		
	Each.....	50.00	50.00	50.00	50.00	50.00	60.00	60.00		
26956.	Portable Ammeters.									
	Range, amperes.....					5	15	25	50	100
	Division, amperes.....					$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	1
	Each.....					65.00	65.00	65.00	65.00	70.00



Slate Rheostat. Type F



Universal Rheostat. Type U

Rheostats, Ruhstrat, Simple Form of Slate, Type F, on aluminum feet, with holes for screwing to table, and prismatic contact.

No.	Amperes	Ohms	Size, mm	Duty Free	Duty Paid
26960.	0.3	250	120 x 30 x 15	3.15	3.50
26964.	"	400	160 x 40 x 15	3.75	4.50
26968.	"	650	200 x 50 x 20	5.45	6.55
26972.	"	1200	300 x 50 x 25	6.10	7.25
26976.	"	1700	400 x 50 x 25	8.20	9.80
26980.	"	2400	450 x 60 x 35	9.40	11.30
26984.	0.6	140	160 x 40 x 15	3.75	4.50
26988.	1.0	55	120 x 30 x 15	3.15	3.80
26992.	"	150	200 x 50 x 20	5.45	6.55
26996.	"	300	300 x 50 x 25	6.10	7.25
27000.	"	440	400 x 50 x 25	8.20	9.80
27004.	"	550	450 x 60 x 35	9.40	11.30
27008.	2.0	14	120 x 30 x 15	3.15	3.80
27012.	"	24	160 x 40 x 15	3.75	4.50
27016.	"	35	200 x 50 x 20	5.45	6.55
27020.	"	70	300 x 50 x 25	6.10	7.25
27024.	"	105	400 x 50 x 25	8.20	9.80
27028.	"	130	450 x 60 x 35	9.40	11.30
27032.	4.0	6	120 x 30 x 15	3.15	3.80
27036.	"	10	160 x 40 x 15	3.75	4.50

No.	Amperes	Ohms	Size, mm	Duty Free	Duty Paid
27040.	4.0	60	450 x 60 x 35	9.40	11.30
27044.	7.0	1.7	120 x 30 x 15	3.25	3.90
27048.	"	3	160 x 40 x 15	3.80	4.55
27052.	"	5	200 x 50 x 20	5.70	6.85
27056.	"	8	300 x 50 x 25	6.75	8.00
27060.	"	16	450 x 60 x 35	9.75	11.70
27064.	10.0	.85	120 x 30 x 15	3.40	4.05
27068.	"	1.5	160 x 40 x 15	3.90	4.70
27072.	"	2.5	200 x 50 x 20	6.00	7.20
27076.	"	4	300 x 50 x 25	7.05	8.45
27080.	"	6	400 x 50 x 25	9.10	10.90
27084.	"	8.5	450 x 60 x 35	10.15	12.20
27088.	15.0	3	400 x 50 x 25	9.10	10.90
27092.	20.0	2.4	120 x 30 x 15	3.40	4.05
27096.	"	0.4	160 x 40 x 15	3.90	4.70
27100.	"	0.5	200 x 50 x 20	6.00	7.20
27104.	"	1	300 x 50 x 25	7.05	8.45
27108.	"	1.6	400 x 50 x 25	9.10	10.90
27112.	"	2.5	450 x 60 x 35	10.15	12.20

To prices given above add the following for extras as indicated, if desired.

# For Rheostats

		Extra for scale with ohm divisions		Extra for winding with wire of increasing diameter		Extra for Ruhstrat cross winding	
		Duty Free	Duty Paid	Duty Free	Duty Paid	Duty Free	Duty Paid
Size, mm	120 x 30 x 15	.85	1.00	.55	.65	.75	.90
"	60 x 40 x 15	.85	1.00	.55	.65	.75	.90
"	200 x 50 x 20	.85	1.00	.55	.65	1.05	1.30
"	300 x 50 x 25	.85	1.00	.55	.65	1.05	1.30
"	400 x 50 x 25	.85	1.00	.85	1.00	1.50	1.80
"	450 x 60 x 35	.85	1.00	.85	1.00	1.50	1.80

Rheostats, Ruhstrat, Universal Form of Slate, Type U, consisting of two resistances mounted side by side on aluminum feet. The two resistances may be operated independently, in series, or in parallel, each being provided with separate contact slide. This form of Rheostat lends itself to a great variety of experimental purposes.

No.	Amperes	Ohms	Size, mm	Duty Free	Duty Paid	No.	Amperes	Ohms	Size, mm	Duty Free	Duty Paid
27116.	7	5	200 x 50 x 20	11.50	13.75	27148.	1	150	200 x 50 x 20	11.00	13.20
27120.	"	0.5	300 x 50 x 25	12.60	15.00	27152.	"	300	300 x 50 x 25	12.00	14.40
27124.	"	1	400 x 50 x 25	14.70	17.65	27156.	"	440	400 x 50 x 25	14.35	17.25
27128.	"	1.6	450 x 60 x 35	16.75	20.00	27160.	"	550	450 x 60 x 35	16.00	19.20
27132.	1.5	2.5	200 x 50 x 20	11.25	13.50	27164.	0.3	60	200 x 50 x 20	11.00	13.20
27136.	"	65	300 x 50 x 25	12.60	15.00	27168.	"	65	300 x 50 x 25	12.00	14.40
27140.	"	120	400 x 50 x 25	14.70	17.65	27172.	"	120	400 x 50 x 25	14.35	17.25
27144.	"	170	450 x 60 x 35	16.75	20.00	27176.	"	170	450 x 60 x 35	16.00	19.20
		250						2400			
		16						250			

## A R T H U R H. T H O M A S C O M P A N Y

To prices given above add the following for extras as indicated, if desired.

Size, mm	Extra for scale with ohm divisions		Extra for winding with wire of increasing diameter		Extra for Ruhstrat cross winding	
	Duty Free	Duty Paid	Duty Free	Duty Paid	Duty Free	Duty Paid
200 x 50 x 20	.45	.55	.45	.55	.75	.90
300 x 50 x 25	.45	.55	.45	.55	1.05	1.30
400 x 50 x 25	.75	.90	.75	.90	1.35	1.65
450 x 60 x 35	.75	.90	.75	.90	1.65	2.00



Metallic Tube Rheostat. Type F



Universal Tube Rheostat. Type U

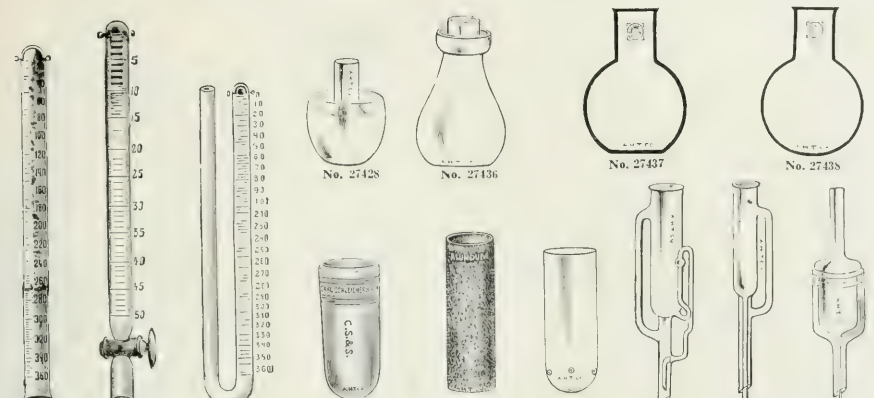
Rheostats, Ruhstrat, Metallic Tube Form, Type F, on foot, consisting of thin walled metal tubes thoroughly insulated with enamel and wound with resistance wire of a special alloy which is so well insulated by means of a microscopically designed oxide deposited on the surface as to permit the wire to lie in contact.

No.	Am-peres	Ohms	Length, mm	Diam., mm	Duty Free	Duty Paid	No.	Am-peres	Ohms	Length, mm	Diam., mm	Duty Free	Duty Paid
27180.	0.3	700	150	30	2.65	3.15	27280.	3.3	42	300	50	5.05	6.05
27184.	"	1000	200	30	3.00	3.60	27284.	"	60	400	50	5.70	6.85
27188.	"	1400	200	40	3.45	4.15	27288.	"	90	500	60	7.60	9.10
27192.	"	2300	300	40	4.20	5.05	27292.	5.0	5	150	30	3.00	3.50
27196.	"	2600	300	50	5.05	6.05	27296.	"	7.5	200	30	3.30	4.00
27200.	"	3600	400	50	5.70	6.85	27300.	"	11	200	40	3.75	4.50
27204.	"	5500	500	60	7.60	9.10	27304.	"	18	300	40	4.65	5.60
27208.	1.0	150	150	30	2.65	3.15	27308.	"	20	300	50	5.25	6.30
27212.	"	225	200	30	3.00	3.60	27312.	"	28	400	50	6.10	7.30
27216.	"	270	200	40	3.45	4.15	27316.	"	45	500	60	8.00	9.50
27220.	"	450	300	40	4.20	5.05	27320.	12.0	1	150	30	3.00	3.50
27224.	"	500	300	50	5.05	6.05	27324.	"	1.5	200	30	3.30	4.00
27228.	"	710	400	50	5.70	6.85	27328.	"	1.8	200	40	3.75	4.50
27232.	"	1130	500	60	7.60	9.10	27332.	"	3	300	40	4.65	5.60
27236.	2.0	25	150	30	2.65	3.15	27336.	"	3.2	300	50	5.25	6.30
27240.	"	38	200	30	3.00	3.60	27340.	"	4.4	400	50	6.10	7.30
27244.	"	50	200	40	3.45	4.15	27344.	"	7.8	500	60	8.00	9.50
27248.	"	85	300	40	4.20	5.05	27348.	20.0	0.25	150	30	3.00	3.50
27252.	"	100	300	50	5.05	6.05	27352.	"	0.4	200	30	3.30	4.00
27256.	"	140	400	50	5.70	6.85	27356.	"	0.45	200	40	3.75	4.50
27260.	"	220	500	60	7.60	9.10	27360.	"	0.75	300	40	4.65	5.60
27264.	3.3	10	150	30	2.65	3.15	27364.	"	0.8	300	50	5.25	6.30
27268.	"	15	200	30	3.00	3.60	27368.	"	1.1	400	50	6.10	7.30
27272.	"	20	200	40	3.45	4.15	27372.	"	1.9	500	60	8.00	9.50
27276.	"	35	300	40	4.20	5.05							

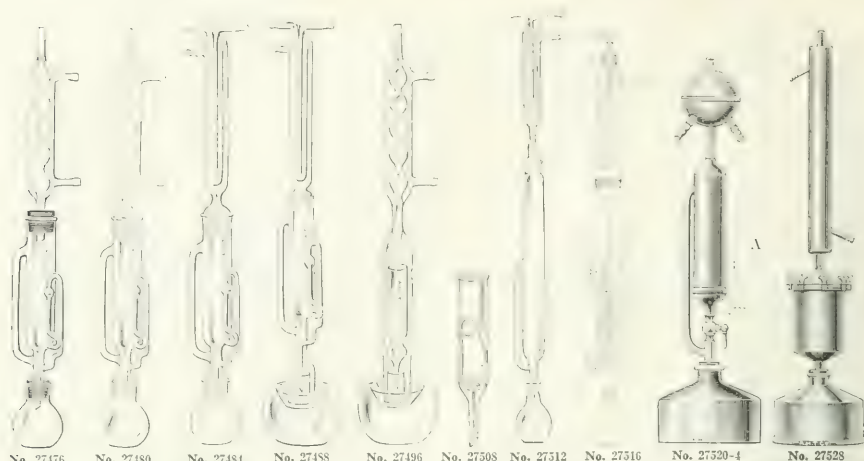
Size		Extra per tube for wire of increasing diameter		Extra for rotary drive with screw		Extra for perforated metal cover		Extra for scale graduated in 100 parts	
Length, mm	Diameter, mm	Duty Free	Duty Paid	Duty Free	Duty Paid	Duty Free	Duty Paid	Duty Free	Duty Paid
150	30	.55	.65	2.05	2.45	.85	1.00	.55	.65
200	30	.55	.65	2.10	2.50	.90	1.10	.55	.65
200	40	.55	.65	2.25	2.70	1.05	1.30	.55	.65
300	40	.60	.75	2.55	3.10	1.15	1.35	.55	.65
300	50	.60	.75	2.55	3.10	1.30	1.50	.55	.65
400	50	.70	.80	2.85	3.45	1.45	1.75	.55	.65
500	60	.85	1.00	3.15	3.80	1.65	2.00	.55	.65

Rheostats, Ruhstrat, Universal Metallic Tube Form, Type U, on feet, consisting of two metal tubes as in Tube Form Type F, but with two independent contacts permitting the use of the resistances either separately in series, or in parallel. A new and useful form in laboratory work. Price twice those quoted above for Tube Form, Type F.

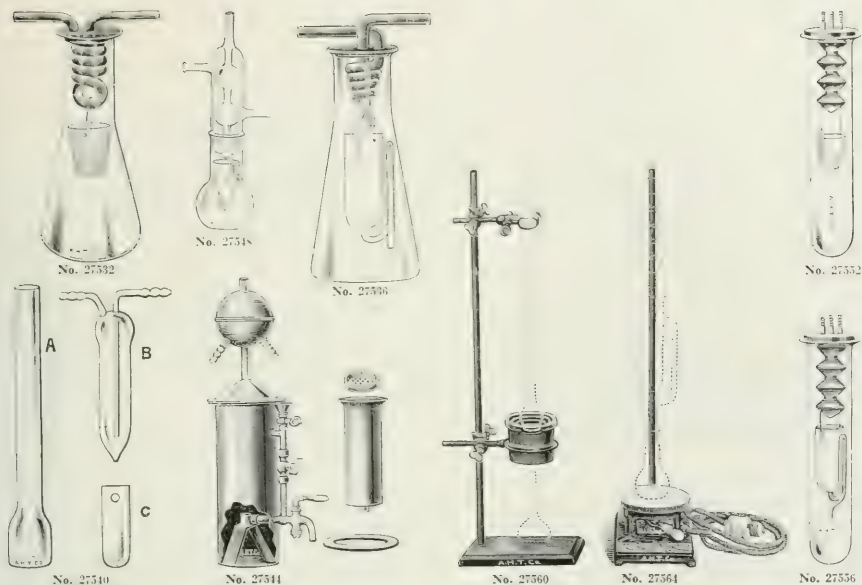
Note—In ordering Rheostats please specify carefully current capacity, resistance, and size desired.

									
No. 27412	No. 27420	No. 27421	No. 27440	No. 27438	No. 27432	No. 27456	No. 27464	No. 27465	
27400.	Emery Cloth, in sheets 9 x 11 inches, fine, medium or coarse.				Per dozen sheets		.70		
27408.	" Paper " 9 x 11 "				Per dozen sheets		.30		
27412.	Eudiometers, Bunsen, with platinum electrodes. Graduated, cc.				50 cc in $\frac{1}{10}$ ths		100 cc in $\frac{1}{10}$ ths		
	Each.				2.50		3.00		
27416.	Eudiometers, Bunsen, graduated in millimeters. Graduated to mm.				300		500		
	Each.				2.00		2.50		
27420.	Eudiometers, Mitscherlich, with glass stopcock and platinum electrodes.				50 cc in $\frac{1}{10}$ ths		100 cc in $\frac{1}{10}$ ths		
	Graduated, cc.				3.50		4.25		
27424.	Eudiometers, Ure, with platinum electrodes. Graduated, cc.				50 cc in 5ths		100 cc in $\frac{1}{10}$ ths		
	Each.				2.00		2.50		
27428.	Extraction Flask, Knorr, for mercury seal; capacity 100 cc.						.40		
27432.	" " " with two holes in the neck to provide for the return flow of ether.						.50		
27436.	" " Sy, with trough for mercury seal, with large neck to facilitate cleaning.								
	Capacity, cc.				100		150		
	Each.				.50		.75		
27437.	Flask, Extraction, New Jena Glass, flat bottom with wide neck and vial mouth.				50		100		
	Capacity, cc.				.12		.13		
	Each.				.12		.13		
27438.	Flask, Extraction, New Jena Glass, round bottom with wide neck and vial mouth.				50		100		
	Capacity, cc.				.12		.13		
	Each.				.12		.13		
27440.	Extraction Thimbles Schleicher & Schüll's No. 603; seamless and made from the best material, it is absolutely impossible for any particles of the substances undergoing extraction to find their way into the ether. The ether itself flows readily from the shells.								
	Diameter, mm.				19		22		
	Height, mm.				90		80		
	Per box of 25.				1.65		1.65		
27444.	Extraction Thimbles, Schleicher & Schüll's New Double, exactly same as above but of double thickness.								
	Diameter, mm.				25		33		
	Height, mm.				80		80		
	Per box of 25.				3.70		3.70		
27448.	Extraction Thimbles, Alundum. For the extraction of soaps, fats, foods, rubber, etc., by both organic and inorganic solvents, these thimbles offer the advantage of being rapid, practically indestructible and readily cleansed by ignition.								
	Diameter, mm.				32		35		
	Height, mm.				51		55		
	Each.				.40		.50		
27452.	Extraction Thimbles, Glass, round bottom, with perforations. Diameter, mm				25		33		
	Height, mm.				80		80		
	Each.				.35		.50		
27456.	Extraction Tubes, Soxhlet. The sizes of thimbles given are for convenience in ordering only as other thimbles may be used in each extraction tube. Inside diameter, mm				30		38		
	Capacity to top of syphon, cc.				70		100		
	Height of syphon tube, mm.				90		112		
	Suitable for S. & S. thimbles, mm.				28 x 80		33 x 118		
	Each.				1.20		1.60		
27460.	Extraction Tube, shape as above but of dimensions required by the Southern Cotton Oil Co.						1.20		
27464.	Extraction Tube, Smalley, for cotton seed oil work.						1.30		
27468.	Extraction Tube, Lehmann, with ground in top, for the extraction of bulky substances.						4.00		

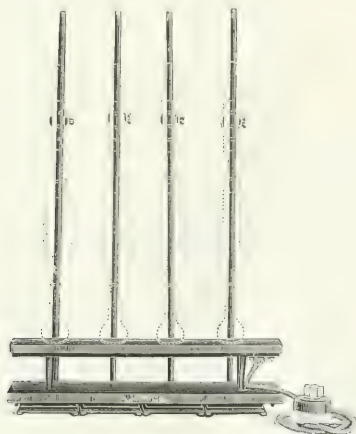




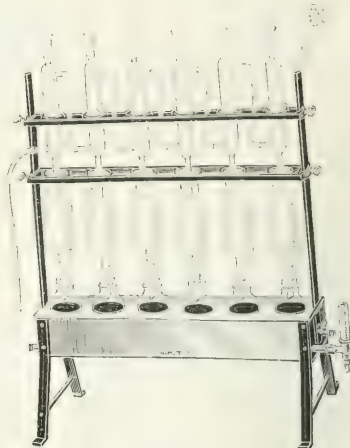
- 27476. Extraction Apparatus, Soxhlet**, complete with flask and condenser. Consisting of bulb condenser, Soxhlet extraction tube No. 27456, and wide mouth Jena extraction flask fitted with specially selected fine grain cork stoppers.  
Inside diameter of Soxhlet Tube, mm. . . . . 30 38 50  
Each . . . . . 3.25 3.50 4.50
- 27480. Extraction Apparatus, Soxhlet**, same as No. 27476 but with ground joints instead of cork stoppers. Each apparatus is furnished with three Jena glass flasks ground to fit extraction tube.  
Inside diameter of Soxhlet tube, mm. . . . . 30 38 50  
Each . . . . . 4.50 5.00 6.00
- 27484. Extraction Apparatus, Soxhlet**, same as No. 27480, i. e., with ground joints throughout, but with Hopkins Condenser in place of bulb condenser. With three Jena extraction Flasks ground to fit.  
Inside diameter of Soxhlet tube, mm. . . . . 30 38 50  
Each . . . . . 5.00 5.50 6.50
- 27488. Extraction Apparatus**, consisting of Soxhlet tube 38 mm inside diameter, Hopkins condenser and Knorr flask; 100 cc, for mercury seal. The joint between the condenser and extraction tube is ground air-tight . . . . . 6.00
- 27492. Extraction Apparatus**, exactly same as No. 27488 but with Sy Flask for mercury seal. . . . . 6.00
- 27496. " Knorr**, complete with condenser, extraction tube with perforated platinum disc and Knorr flask. See U. S. Department of Agriculture, Bureau of Chemistry, Circular No. 69, Walter & Goodrich "Improvements in the Knorr Fat Extraction Apparatus" . . . . . 6.50
- 27500. Extra Condenser** with adapter sealed on. . . . . 3.60
- 27504. " Extraction Tube**, with platinum disc. . . . . 3.00
- 27508. " Tube**, improved form with nickel disc and wire spring. . . . . 1.20
- Note**—If Knorr flasks are desired with two  $\frac{1}{4}$  inch holes in neck for return of flow of ether, an extra price of 10¢ per flask is charged.
- 27512. Extraction Apparatus, Ringer**, with Hopkins condenser. An extraction apparatus well suited for continuous extractions from liquid media. The ether as it condenses in the condenser drips down into a central tube which permits of its escape through small openings at its bottom. The ether then, because of its gravity, rises to the surface of the medium to be extracted. This apparatus is well adapted for the extraction of  $\beta$ -oxybutyric acid from diabetic urine. As used in the Laboratory of Physiological Chemistry, Medical Department, University of Pennsylvania. All joints ground air-tight. Inside diameter of extraction tube 38 mm, length of extraction tube 37 cm. Complete with three flasks ground to fit. . . . . 8.00
- 27516. Extraction Apparatus, Friedrichs**, for continuous liquid extractions. Complete with counter current condenser and three flasks, with all joints ground air-tight. The condensed ether from the condenser drops into the funnel tube of the extractor and reaches the bottom through the screw-cylinder. It then ascends and the new drops enter the liquid to be extracted. When the ether layer reaches the lower tube the excess runs back into the flask and the process goes on. By means of the stopcock funnel and the lower stop-cock, liquid may be introduced or drawn off without interrupting the operation. See *Zeitschrift für anal. Chemie*, 1911 . . . . . 15.00
- 27520. Extraction Apparatus, Teas**, as used in tanning laboratories; extractor, flask and reflux condenser are of heavy copper, the flask being of 1 quart capacity. Original form without side tube A. 17.40
- 27524. Extraction Apparatus, Teas**, as above with side tube A for flooding contents of extraction. . . . . 18.00
- 27528. Extraction Apparatus, Yocum**, as used in tanning laboratories. The extractor and flask are of heavy polished copper, the latter of 1 liter capacity. The condenser is of brass ground in. . . . . 24.00



- 27532. Extraction Apparatus, Cottle**, frequently referred to as the Underwriter's Laboratories form. See November *Journal of Industrial and Engineering Chemistry*, 1912; consisting of a metallic spiral reflux condenser supporting a porcelain Gooch crucible by means of platinum or aluminum wire. All contained in a specially designed, long neck Erlenmeyer flask, the whole apparatus being only 6 inches high and 3 inches wide. Specially recommended for use in testing rubber compounds as used on wires and cords. . . . . **2.50**
- 27536. Extraction Apparatus, for Rubber Analysis**, as recommended by the Joint Rubber Insulation Committee. See *Journal of Industrial and Engineering Chemistry*, January, 1914. This apparatus is in general like the preceding form but with a syphon cup for holding the paper extraction thimble instead of a Gooch crucible as used in the Cottle form. In addition, all of the dimensions are slightly different, being in exact accordance with the specifications of the Committee above referred to. . . . . **2.50**
- 27540. Extraction Apparatus**, as used in the Food Laboratories, Bureau of Chemistry, U. S. Department of Agriculture. Parts are supplied separately at the prices given or the complete outfit at the total of the three prices.
- A—Cylinder, 20½ inches long, 2 inches in diameter, except at its lower or sealed end, which is enlarged to diameter of 3 inches for a length of 4 inches. . . . . **1.50**
- B—Condenser, 1½ inches in diameter, except at its upper end which is enlarged to a bulb 2½ inches in diameter, to permit its suspension in "A". . . . . **1.50**
- C—Thimbles, 6 inches long and 1½ inches in diameter, perforated ¼ inch from top with two ¼ inch holes placed opposite each other, capacity 100 cc, with straight upper rim. . . . . **.50**
- 27544. Extraction Apparatus, Reed**, as used for bark and wood extracts, etc.; in use in many tanning laboratories. Of polished copper, with polished condenser. Complete as shown in illustration. . . . . **18.00**
- 27548. Extraction Apparatus, Thorn**, with ground joint condenser.
- |                       |             |             |
|-----------------------|-------------|-------------|
| Height, mm. . . . .   | 180         | 240         |
| Diameter, mm. . . . . | 30          | 40          |
| Each. . . . .         | <b>2.40</b> | <b>4.00</b> |
- 27552. Extraction Apparatus, Wiley**, with metallic condenser and top and with porcelain Gooch crucible. No stoppers are required and the arrangement permits double weighing of both residue and extracted matter. . . . . **5.00**
- 27556. Extraction Apparatus, Wiley-Richardson**, a simple form, recommended where much work is done on fats, oils, gums and resins, combining the simplicity and efficiency of the original Wiley apparatus with the maceration and percolation method of washing as in the regular Soxhlet apparatus. Complete with glass syphon cup as shown in illustration but without extraction thimbles. . . . . **5.00**
- 27560. Support and Gas Heating Apparatus for Extraction Apparatus**, consisting of extra large support, ring 95 mm, clamp, cast iron water bath, 120 mm, without burner or glassware. . . . . **2.50**
- 27564. Support and Electric Heating Apparatus for Extraction Apparatus**, consisting of large support, clamp and electric heater for three heats, 115 mm, the latter being set into the base of the support. These supports may be arranged in banks of three, six, twelve, etc., and form a convenient and satisfactory method of conducting extractions as each extractor may be operated at a given heat independently of the others. For either 110 or 220 volts. Voltage must be stated in ordering. . . . . **7.00**

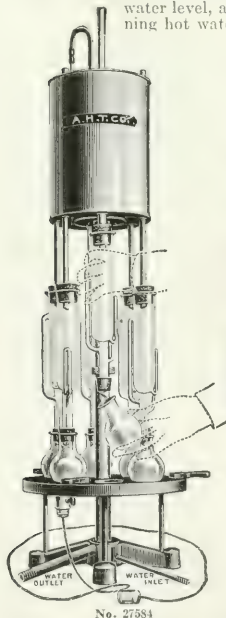


No. 27568

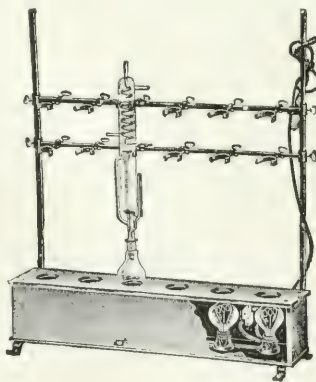


No. 27572

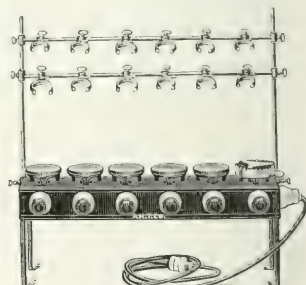
27568. Support and Electric Heating Apparatus for Four Extractions, consisting of 4 supports, 4 clamps and electric hot plate, without glassware. A convenient arrangement as the hot plate is not permanently attached to the bases of the supports and may be used for other work as well, as may also the supports. .... 15.40
27572. Support and Heating Apparatus for Six Extractions, consisting of rectangular copper water bath, with water level, and special upright supports for six extractors. Can be heated either by gas or running hot water. Without glassware or burner. .... 24.00



No. 27584

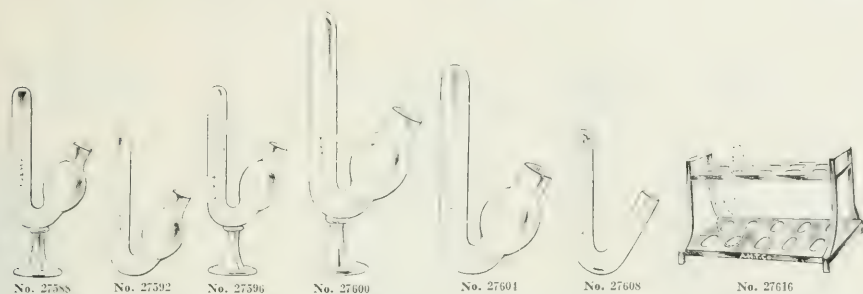


No. 27576

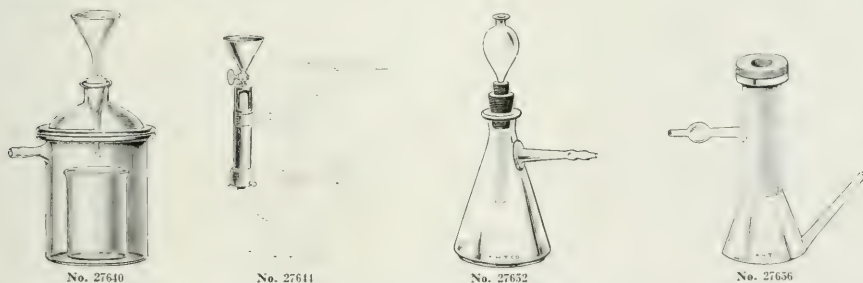


No. 27580

27576. Support and Electric Heater for Six Extractions, for heating by electric lamps. Box support is made of asbestos wood, with holes over the lamps used for heating. With iron uprights and adjustable metal rods with six clamps each. State voltage in ordering. Without glassware, .... 30.00
27580. Support with Electric Heaters for Six Extractions, similar to above but with electric hot plates with individual switches and support. The base is of sheet iron, 9 inches high, 5½ inches wide and 24 inches long. State voltage in ordering. .... 55.00
27584. Revolving Support and Electric Heating Apparatus for Extraction Apparatus with copper condenser. The tank of the condenser is adjustable in height so that extractors of different sizes may be used. The temperature of the hot plate is high enough to volatilize solvents of the highest boiling point generally used in fat extractions. Where different temperatures are required small discs of asbestos may be inserted under the flasks. Very economical of space and of current. For either 110 or 220 volts. Voltage must be stated in ordering. .... 35.00

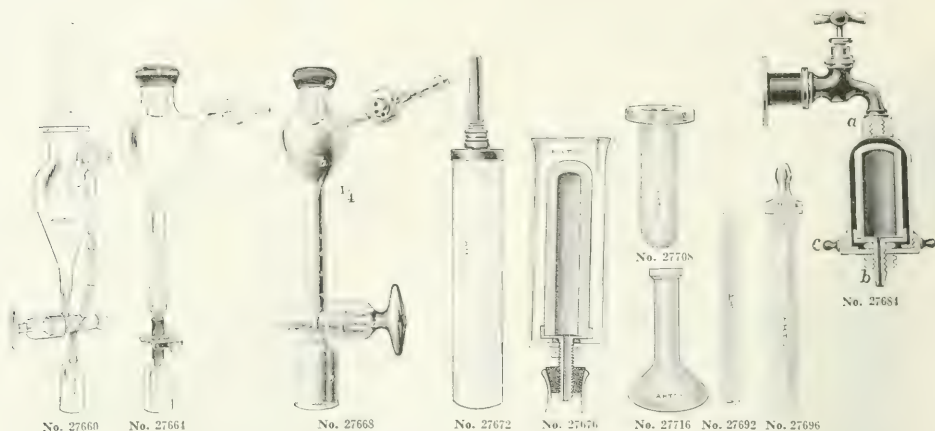


27588.	Fermentation Tubes, for bacteriological work, small size; height of vertical tube 100 mm, outside diameter of tube 12 to 13 mm; with long tubulation for plugging and bulb carefully made to hold entire contents of vertical tube; on glass foot, ungraduated.....	.25
27592.	Fermentation Tube, same size and shape as No. 27588 but without glass foot.....	.15
27596.	" " same size and shape as No. 27588 with glass foot and tube graduated in cubic centimeters.....	.50
27600.	Fermentation Tube, American Public Health Association standard. See "Standard Methods for the Examination of Water and Sewage." Inside diameter of upright tube 15 mm, length of vertical tube 140 mm, diameter of bulb 38 mm, on glass foot.....	.35
27604.	Fermentation Tube, same as No. 27600, but without glass foot.....	.20
27608.	" " without bulb, so-called "fish hook" form; height of vertical tube 100 mm, outside diameter of tube 12 to 13 mm.....	.10
27612.	Fermentation Tube, Smith, without foot, designed primarily for the cultivation of anaerobes, in exact accordance with the specifications given us by the author; carefully made as to all dimensions and as to the angle between the vertical tube and the bulb; in appearance similar to No. 27604. ....	.30
27616.	Fermentation Tube Support, of copper; for 10 tubes without foot, of the usual size.....	2.50
27620.	Figures, of steel, for stamping steel, iron, bullion, etc. In sets of 9. Face, inches.....	1.00 1.25
Per set of nine.....		
27624.	Files, flat, best quality. Length, inches.....	3 4 5 6 7 8
	Each.....	.10 .12 .15 .15 .18 .20
27628.	Files, round (Rat tail), best quality. Length, inches.....	4 5 6 8
	Each.....	.10 .12 .15 .20
27632.	Files, triangular, best quality. Length, inches.....	3 4 5 6 8
	Each.....	.08 .10 .12 .15 .20
27636.	File Handle, best quality.....	.05

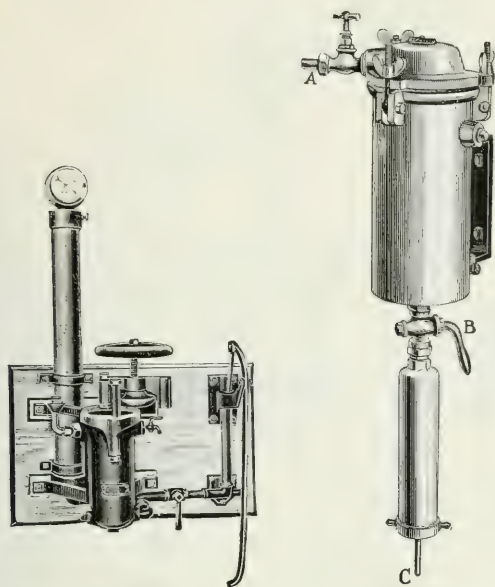


27640.	Filtering Apparatus, Witt, with ground in funnel and ground on glass cover with side tubulation for filtering into beaker, or other receptacle, under diminished pressure. Price does not include beaker. The main body of the jar is 16 cm high by 12 cm in diameter and ground in funnel in 9 cm in diameter.....	4.50
27644.	Filter Apparatus, Martin, for filtering toxins or for filling bulbs with sterile liquid by means of a filter or other suction pump. Consisting of Pasteur-Chamberland cylinder in special metal mounting with funnel and stopcock. All parts are demountable, permitting sterilization in the autoclave. Without stand, clamps or glass bulb these being indicated in illustration to show arrangement only.....	12.60
27648.	Filter Apparatus, Martin, complete with suitable support and clamps.....	14.00
27652.	Filter Apparatus, Kitasato, consisting of 1000 cc flask, filter cylinder with bulb and rubber stopper.....	2.50
27656.	Filter Apparatus, Reichel, improved form, for separating the bacteria in fluid cultures from their various products. Complete with special flask of about 150 cc capacity, filter cylinder and rubber and asbestos rings.....	2.75

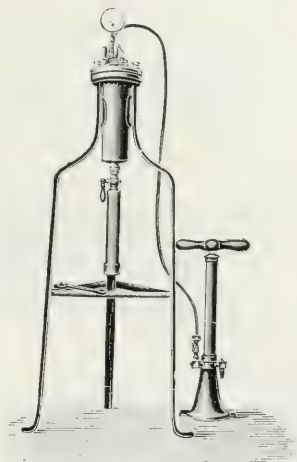




27660.	Filter Apparatus, Uhlenhuth and Weidanz, for filtering serums, etc., for immediate delivery into ampoules without exposure. With measuring tube on the side for measuring doses up to 2 cc. May be used with Berkefeld filter and glass mantle as indicated in illustration, but filter cylinder and glass mantle with rubber stopper are not included in the price. It may also be used with Maassen cylinder No. 27708 by means of asbestos ring and rubber cap. . . . .	6.00
27661.	Filter Apparatus, similar to above but with Silberschmidt filter held in place by rubber band with asbestos ring. Graduations on the tube permit the delivery of accurate doses into ampoules by means of pinchcock. Price does not include filter cylinder. . . . .	4.50
27668.	Filter Apparatus, same as 27664 with glass stopcock, but without filter cylinder. . . . .	6.00
27672.	Filters, Berkefeld, cylinders only with metallic head-pieces. As widely used in all laboratory work in the filtration of toxines and the preparation of sterile liquids of all sorts. These filters are furnished in three degrees of fineness:— "W" = very fine or slow filtering. "N" = normal or medium filtering. "V" = coarse or rapid filtering. Unless other specifications are given, the "N," or normal, filters are supplied on all orders.	
	Number. . . . . 1 2 13 3 5 6 Size, inches. . . . . 10 x 2 8 x 1 5 x 1 2½ x 5 1½ x 5 ¾ x 5 Each. . . . . 3.50 3.00 2.50 1.25 1.15 1.00	
27676.	Filters, Berkefeld, as above but with glass mantle with circular opening in bottom into which metal head-piece is clamped.	
	Number. . . . . 1 2 13 3 5 6 Each. . . . . 5.25 4.25 3.75 2.00 1.65 1.50	
27680.	Glass Mantles, only, for Berkefeld Filters, such as are included with the cylinder in No. 27676.	
	Number. . . . . 1 2 3 5 7 Size, inches. . . . . 11 x 4 11 x 2½ 4 x 1 2½ x 1 1½ x 1½ Each. . . . . 1.75 1.25 .75 .50 .50	
27684.	Filters, Berkefeld, Household. Can be screwed to any ½ inch bib faucet. In nickel plated mount with filter cylinder 6½ x 2½ inches. . . . .	4.00
27688.	Extra Filter Cylinder, only. . . . .	1.50
27692.	Filter Cylinder, of unglazed porcelain, 200 x 17 mm, outside dimensions. As used in Kitasato and similar filters. . . . .	20
27696.	Filter Cylinder, Pasteur-Chamberland, Bougie "B," i. e., fine and suitable only for use with pressure. original French make, with glazed flange and nipple, 200 mm long by 25 mm diameter. . . . .	1.25
27700.	Filter Cylinder, Pasteur-Chamberland, Bougie "F," i. e., of coarser texture and suitable for ordinary filtrations; same size and shape as above. . . . .	1.25
27704.	Filter Cylinder, Berkefeld, of same shape as Pasteur Chamberland, i. e., with glazed flange and nipple; may be used interchangeably with these in the pressure apparatus. . . . .	3.00
27708.	Filter Cylinder, Maassen, of unglazed German porcelain with glazed flange at top, for use by the Maassen, Reichel or Silberschmidt method, i. e., with asbestos ring between the flange and the top of the filter flask; 130 mm long by 35 mm diameter. . . . .	1.25
27712.	Filter Cylinders, Berkefeld, of the same shape and for the same purpose as above.	
	Length, inches. . . . . 5½ 5½ 1½ Diameter, inches. . . . . 1½ 1½ 1½ Each. . . . . 2.50 1.25 1.10	
27716.	Filter Balloon, Pukal, of unglazed Royal Berlin porcelain.	
	Capacity, cc. . . . . 50 140 500 1000 Each. . . . . .65 1.00 1.75 3.00	



No. 27720



No. 27728

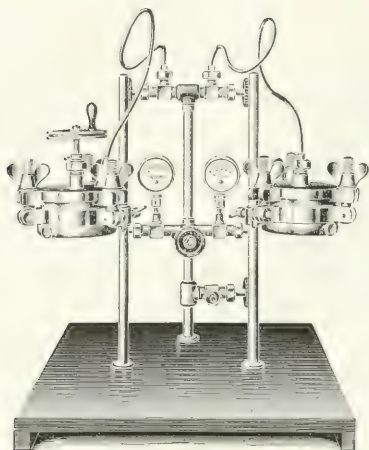
27720. **Filter Apparatus for Pressure, Hill**, for the use of hydraulic pressure. By this method the material to be filtered is separated from the pressure medium by a soft rubber membrane. This avoids foaming and also permits the use of water instead of air pressure. City water service will usually furnish 40 lbs. per square inch, which is about three times the pressure of a vacuum filter. The force pump supplied increases this to 300 lbs. per square inch. At the left top of the chamber is a block tin funnel and tube, through which the liquid is introduced to the filter. To this tube inside the chamber a flexible rubber tube connects the soft rubber filter bag. Within this bag is placed the Berkefeld, or similar, bougie, the nozzle of which fits through a bushing at the bottom of the filter chamber and delivers the filtered liquid below. The side funnel tube of tin is soldered into a brass nut, which, together with the tube, is readily removable for sterilization. There is a rubber washer at the base of this nut and a screw stopper in the funnel to prevent back flow under pressure. When filled the screw plug is inserted in the funnel and the contents of the bag may be subjected to the required pressure. The three-way cock enables one to admit water to the chamber, to close the chamber from the service pipe, leaving it under pressure, and to drain the chamber. The vertical pipe with pressure gauge at the top is an air pressure storage chamber and is for the purpose of keeping a fairly uniform pressure without continuous pumping. There is a vent cap at the top. This should be kept tightly closed. If it leaks, air will be gradually forced out and the chamber will be kept filled with water. In that case its usefulness would be temporarily impaired and, moreover, a single stroke of the pump would then raise the pressure beyond a safe point. Complete with one 8 x 1 inch Berkefeld cylinder and 1 liter rubber bag..... 92.00

27721. **Extra Rubber Bag**, 1 liter capacity..... 1.50  
 27722. " " 150 cc capacity..... 1.35

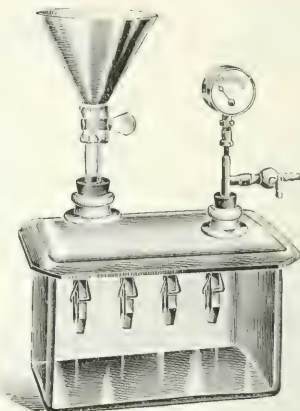
27724. **Filter Apparatus**, for filtering toxins by means of pressure. As supplied by us to the Antitoxin Laboratories of the Philadelphia Board of Health. Consisting of a cast iron bowl, enameled inside, 20 inches deep and 6 inches in diameter, with air-tight cover held down by four wing nuts, and with pressure cock attached and bracket for fastening on wall. Attached below is a detachable, nickel plated metal cylinder with a ground in stopper, carrying a Berkefeld cylinder 10 x 2 inches. Price includes the Berkefeld cylinder..... 50.00

27728. **Filter Apparatus for Pressure, Chamberland-Pasteur**. Original French make, with manometer, pressure pump and Pasteur-Chamberland cylinder.  
 Duty Free..... 45.00      Stock..... 60.00

27732. **Filter Bags**, of felt.  
 Capacity, quarts..... 1      2      4  
 Size, inches..... 8½ x 8      9½ x 10      12 x 13½  
 Each..... .50      .70      1.25



No. 27736



No. 27736

27736. Ultrafiltration Apparatus, Bechhold, as used in the Kgl. Institut für Experiment. Therapie, Frankfurt, a. M., consisting of a double filtration apparatus, one with stirrer and one with glass trough, with ground-on lid, separatory funnel, manometer and twelve clamps, but without the ultrafilter discs.

Duty Free..... 80.00

Duty Paid..... 115.00

27740. Ultrafilter Discs, Bechhold, for use in the above apparatus, as used for filtering and separating colloids and crystalloids, albumenoids, albumoses, ferments, soaps, etc., as well as for testing beer, milk, etc. In Physiological Chemistry it is most useful in the examination of animal fluids such as urine, serous liquid, blood, etc., and in Bacteriology during the examination of the products of bacterial growth (toxins and antitoxins); while in Pharmacology, filtration of decoctions and extracts is facilitated by its use. The permeability of the ultrafilter to various colloids depends on its density, i.e., to the percentage content of nitrocellulose in the acid collodion impregnating the filter, i.e., the higher the percentage the denser the filter. A 4½% ultrafilter will, generally, prevent the passage of haemoglobin from a 1% solution. Small variations in either direction can not be completely avoided. Each filter is sent out between perforated parchment paper immersed in water to which a little chloroform has been added to prevent the growth of micro-organisms and the whole contained in an aluminum case sealed by a rubber ring, as after a filter becomes dry it is useless. The filters are impregnated in vacuo with acetic acid collodion and are supplied under the designations of 1½, 3, 4½, 6 and 7½%, according to the content of nitrocellulose in the collodion. The filters are 90 mm in diameter.

Designation..... 1½% 3% 4½% 6% 7½%

Duty Paid, per case of 10..... .90 1.20 1.40 1.75 2.00

# References.

Kolloidstudien mit der Filtrationsmethode (Ultrafiltration) von H. Bechhold, Zeitschrift für physikal Chemie, LX. 3, 1907.

Die Gallertfiltration (Ultrafiltration) von H. Bechhold, Zeitschrift für Chemie und Industrie der Kolloide, Bd. II, Heft 1 und 2

Ultrafiltration von H. Bechhold, Biochemische Zeitschrift 6, Heft 5 und 6.

Ultrafiltration und Ultrafilter von Prof. Dr. E. Bertarelli, Zentralblatt für Bakteriologie 42, nr 22 und 23.

Ultrafiltration von T. I. I. Buijdenijck, Chemisch Weekblad 1910, nr. 20.

Die Trennung von Emulsionen durch Filtration und Ultrafiltration von E. Hatschek, Zeitschrift für Chemie und Industrie der Kolloide, Bd. VI, Heft 5.

Versuche zur Aufklärung des zellfreien Gärungsprozesses mit Hilfe der Ultrafilter von A. v. Lebedew, Biochemische Zeitschrift 20, Heft 1 und 2

Conférence donnée au 1<sup>er</sup> Congrès intern. de Brasserie le 25.7. 1910 par M. H. Van Laer.

Pulsierende Ultrafiltration von H. Bechhold, Van Bemmelen Festschrift 430-433.

Funktion der Nierenglomeruli und Ultrafiltration von Burian, Pflüger's Archiv. d. Physiol. 136, 741-760.

27744. Filter Discs, Alundum. These discs can be advantageously used to replace perforated porcelain plates in many operations, obviating the necessity of preparing an asbestos mat. They are easily cleaned by reverse washing and ignition, permitting of their repeated use. They are supplied in two degrees of porosity RA 225 Medium and RA 98 Porous, which must be specified in ordering. Edges are moulded to a 60° bevel to fit funnels.

Diameter, inches.....	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$
Thickness, inches.....	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{2}$

Each.....	.25	.25	.35	.50	.75	1.00	1.25	1.50	1.75
-----------	-----	-----	-----	-----	-----	------	------	------	------



No. 27748



No. 27752



No. 27756

27748. **Filter Cones, Alundum.** These may be used in any 60° funnel by stretching a wide band of rubber tubing over the funnel. They have a large filtering area and can be thoroughly washed from all soluble salts and are recommended for the filtration of gelatinous and slow filtering solutions. They may be cleansed by reverse washing, reduced to a constant weight by ignition and used repeatedly. They are furnished in three degrees of porosity, RA 320 dense, RA 321 medium and RA 322 porous. Please specify porosity in ordering. Each cone is supplied with wire stand as shown in illustration.
- |                       |     |     |     |
|-----------------------|-----|-----|-----|
| Diameter, inches..... | 1½  | 2½  | 4½  |
| Capacity, cc.....     | 20  | 50  | 100 |
| Each.....             | .30 | .35 | .50 |
27749. **Rubber Gaskets** for use with any of the above..... .05
27752. **Filter Dish, Alundum.** Will fit into the top of any 60° funnel and affords a rapid means of filtering large amounts by suction. Well adapted to organic work. Supplied in three degrees of porosity, RA 84, RA 360 and RA 98. Diameter 5½ inches, capacity 400 cc..... 1.50
27753. **Rubber Gasket** for use with above Dish..... .50
27756. **Filter Paper, White, A. H. T. Co. Special.** This paper is offered for qualitative work and general manufacturing purposes, as being unequalled in strength, uniformity of texture and clear and rapid filtering. We have supplied this paper in large quantities to leading college and university laboratories throughout the U. S., for use in qualitative chemistry.
- |                    |     |     |     |     |      |      |      |
|--------------------|-----|-----|-----|-----|------|------|------|
| Diameter, mm.....  | 75  | 90  | 100 | 110 | 125  | 150  | 180  |
| Price per 100..... | .10 | .11 | .12 | .14 | .15  | .20  | .26  |
| Diameter, mm.....  | 200 | 250 | 330 | 380 | 450  | 500  | 600  |
| Per 100.....       | .33 | .46 | .70 | .86 | 1.20 | 1.50 | 2.00 |
27760. **Filter Paper, White, A. H. T. Co. Special.** Same as above, in sheets 480 x 480 mm. Per 100..... 1.36
27764. **Filter Paper, Gray, A. H. T. Co.** Very tough and durable. Especially designed for pharmaceutical and manufacturing purposes.
- |                   |     |     |     |     |     |     |     |     |      |      |      |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Diameter, mm..... | 100 | 125 | 150 | 180 | 200 | 250 | 330 | 380 | 450  | 500  | 600  |
| Per 100.....      | .11 | .14 | .18 | .24 | .28 | .40 | .60 | .76 | 1.10 | 1.40 | 1.80 |
27768. **Filter Paper, Gray, A. H. T. Co.** Same as above, in sheets 500 x 500 mm. Per 100..... 1.25
27772. **Filter Paper, Baker & Adamson,** washed in hydrochloric acid, very rapid filtering, all soluble salts removed ("single washed.")
- |                   |     |     |     |     |     |     |
|-------------------|-----|-----|-----|-----|-----|-----|
| Diameter, mm..... | 55  | 70  | 90  | 110 | 125 | 150 |
| Per 100.....      | .15 | .30 | .45 | .55 | .60 | .85 |
27776. **Filter Paper, Baker & Adamson, "A" Quality,** thin paper, very rapid filtering, for general analytical works very low ash.
- |                        |        |        |        |        |         |         |
|------------------------|--------|--------|--------|--------|---------|---------|
| Diameter, mm.....      | 55     | 70     | 90     | 110    | 125     | 150     |
| Ash in each paper..... | .00001 | .00002 | .00003 | .00005 | .000065 | .000093 |
| Per 100.....           | .40    | .50    | .65    | .80    | 1.00    | 1.20    |
27780. **Filter Paper, Baker & Adamson, "B" Quality,** dense paper for filtering Barium Sulphate, Calcium Oxalate, and other troublesome precipitates, also rapid filtering.
- |                        |        |        |        |       |       |       |
|------------------------|--------|--------|--------|-------|-------|-------|
| Diameter, mm.....      | 55     | 70     | 90     | 110   | 125   | 150   |
| Ash in each paper..... | .00006 | .00012 | .00015 | .0003 | .0004 | .0005 |
| Per 100.....           | .40    | .50    | .65    | .80   | 1.00  | 1.20  |
27784. **Filter Paper, Munktell, No. 00.** For special scientific work—washed in hydrofluoric and hydrochloric acids. Cut in round filters, 100 filters in a package, five packages in a box of birch bark.
- |                   |         |         |         |         |         |         |
|-------------------|---------|---------|---------|---------|---------|---------|
| Diameter, mm..... | 55      | 70      | 90      | 110     | 125     | 150     |
| Ashes, gram.....  | 0.00011 | 0.00018 | 0.00030 | 0.00045 | 0.00058 | 0.00083 |
| Per 100.....      | .50     | .55     | .80     | 1.00    | 1.10    | 1.25    |
27788. **Filter Paper, Munktell, No. 0.** Washed with hydrochloric acid, removing traces of iron, alumina, lime, etc. The ash is reduced to a minimum, and a high standard of purity is secured. A uniform and quick filter, retaining fine precipitates, adapted to the most precise requirements of analytical work. Cut in round filters, 100 filters in a package, five packages in a box of birch bark.
- |                  |         |         |         |         |         |         |
|------------------|---------|---------|---------|---------|---------|---------|
| Diameter mm..... | 55      | 70      | 90      | 110     | 125     | 150     |
| Ashes, gram..... | 0.00060 | 0.00010 | 0.00017 | 0.00025 | 0.00033 | 0.00046 |
| Per 100.....     | .20     | .27     | .42     | .55     | .63     | .85     |





No. 27788



No. 27812



No. 27796

27792. Filter Paper, Munktel, No. 0. Same as above in sheets 480 x 480 mm. Per quire ..... 2.50
27796. Filter Paper, Munktel, No. 1F. The Original Swedish Paper. Of best linen material, by some claimed to be the most perfect filtering paper made; leaves one-third less ash than formerly, probably the smallest amount of any of unwashed paper. Cut in round filters, 100 filters in a package, five packages in a box of birch bark.
- |                  |         |         |         |         |         |         |         |
|------------------|---------|---------|---------|---------|---------|---------|---------|
| Diameter mm..... | 55      | 70      | 90      | 110     | 125     | 150     | 185     |
| Ashes, gram..... | 0.00014 | 0.00023 | 0.00038 | 0.00056 | 0.00073 | 0.00105 | 0.00161 |
| Per 100.....     | .11     | .16     | .25     | .30     | .40     | .50     | .75     |
27800. Filter Paper, Munktel, No. 1F. Same as above in sheets 480 x 480 mm. Per quire ..... 1.20
27804. Filter Paper, Munktel, No. 2. A pure white linen paper of medium thickness, not as closely made, therefore more rapid in filtration. A superior paper for all laboratory work.
- |                  |         |         |         |         |         |         |         |
|------------------|---------|---------|---------|---------|---------|---------|---------|
| Diameter mm..... | 55      | 70      | 90      | 110     | 125     | 150     | 185     |
| Ashes, gram..... | 0.00018 | 0.00030 | 0.00051 | 0.00074 | 0.00095 | 0.00138 | 0.00209 |
| Per 100.....     | .10     | .13     | .20     | .26     | .31     | .40     | .53     |
27808. Filter Paper, Munktel, No. 2. Same as above in sheets 480 x 480 mm. Per quire ..... 1.00



No. 27820



No. 27818

27812. Filter Paper, C. S. & S., No. 595. A good light paper, free of chlorine and tasteless, made of the best material. A filter of 15 cm diameter filters 100 cubic cm of water in 50 to 80 seconds.
- |                  |     |     |     |     |     |     |     |     |     |      |      |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Diameter mm..... | 55  | 70  | 90  | 110 | 125 | 150 | 185 | 240 | 270 | 320  | 385  |
| Per 100.....     | .10 | .11 | .16 | .18 | .20 | .28 | .34 | .65 | .85 | 1.05 | 1.25 |
27816. Filter Paper, C. S. & S., No. 595. Same as above in sheets 470 x 540 mm. Per 100..... 2.20
27820. Filter Paper, C. S. & S., No. 597. A stouter paper than the foregoing, perfectly white and clean, filters very quickly (100 cubic cm of water pass through a plain filter of 15 cm diam. in 80 to 100 seconds). A standard paper for analytical purposes.
- |                  |     |     |      |      |      |      |
|------------------|-----|-----|------|------|------|------|
| Diameter mm..... | 55  | 70  | 90   | 110  | 125  | 150  |
| Per 100.....     | .15 | .16 | .22  | .28  | .30  | .38  |
| Diameter mm..... | 185 | 240 | 270  | 320  | 385  | 500  |
| Per 100.....     | .48 | .75 | 1.00 | 1.20 | 1.55 | 2.60 |
27824. Filter Paper, C. S. & S. No. 597. Same as above in sheets 580 x 580 mm. Per 100..... 4.20
27828. Filter Paper, C. S. & S. No. 571, fat extracted for milk analysis. See M. A. Adams "Analyst" 1885, p. 46. In strips 56 x 65 mm. Per 50 strips..... 1.75
27832. Filter Paper, C. S. & S. No. 604, soft. This paper is similar to No. 597 but has the additional advantage of possessing rapid filtering in the highest degree. In all cases where quick working is desired this paper is most suitable, excepting where the precipitate to be filtered, is very fine and requires a closer and harder paper.
- |                |     |     |     |     |     |     |     |     |      |      |      |      |
|----------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| Diam., mm..... | 55  | 70  | 90  | 110 | 125 | 150 | 185 | 240 | 270  | 320  | 385  | 500  |
| Per 100.....   | .15 | .16 | .22 | .28 | .30 | .38 | .48 | .75 | 1.00 | 1.20 | 1.55 | 2.60 |
27836. Filter Paper, C. S. & S. No. 604, in sheets 580 x 580 mm. Per 100 sheets..... 4.20

A R T H U R H. T H O M A S C O M P A N Y

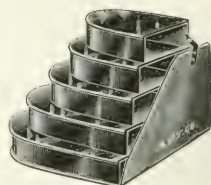
27840.	<b>Filter Paper, C. S. &amp; S. No. 575.</b> Hardened filters, especially adapted for use with the filter pump as they cling closely to the sides of the funnel. These hardened filters will retain the finest precipitates and resist pressures of 2 or 3 atmospheres when moist. Another important feature is durability in continued use, one sheet of this paper being available for several operations, as the precipitate can be scraped off without removing the fluff from the filter. They are probably the only papers which are suitable for the filtration of caustic liquids, requiring a long time to deposit, such as solutions of bichloride of tin (SnCl <sub>2</sub> ), chloride of antimony (SbCl <sub>3</sub> ) also acids and strong alkalis.
	Diameter mm..... 40 55 70 90 110 125 150
	Per 100..... .42 .52 .56 .82 1.00 1.10 1.30
	Diameter mm..... 185 240 270 320 385 500
	Per 100..... 1.70 2.60 3.40 4.15 5.50 9.00
27844.	<b>Filter Paper, C. S. &amp; S. No. 588.</b> Folded Filters. For general use.
	Diameter mm..... 125 185 240 320 385 500
	Per 100..... .32 .48 .68 1.10 1.45 2.40
27848.	<b>Filter Paper, C. S. &amp; S. No. 589 "Black Ribbon."</b> Washed in hydrochloric and hydrofluoric acid, of soft and very loose composition, filtering very quickly. Used for deposits which do not pass through easily, as is the case with many metals. Specially adapted for use in laboratories of metallurgy. For BaSO <sub>4</sub> and similar deposits passing through easily, these filters should not be used.
	Diameter mm..... 55 70 90 110 125 150
	Ashes, gram..... .00004 .00007 .00011 .00017 .00021 .00025
	Per 100..... .52 .55 .82 1.00 1.10 1.30
27852.	<b>Filter Paper, C. S. &amp; S. No. 589 "Blue Ribbon."</b> Washed in hydrochloric and hydrofluoric acid, and made from close, firm material. We recommend them to be used in connection with an air-pump or if possible as folded filters. They are suitable for the finest precipitations, which are not kept back by the black or white ribbon.
	Diameter mm..... 55 70 90 110 125 150
	Ashes, gram..... .00004 .00007 .00011 .00017 .00021 .00025
	Per 100..... .52 .55 .82 1.00 1.10 1.30
27856.	<b>Filter Paper, C. S. &amp; S., No. 589 "White Ribbon."</b> Washed in hydrochloric and hydrofluoric acid. Suitable for most analytical purposes. These filters filter quickly and retain a properly treated deposit of BaSO <sub>4</sub> .
	Diameter mm..... 55 70 90 110 125 150
	Ashes, gram..... .00004 .00007 .00011 .00017 .00021 .00025
	Per 100..... .52 .55 .82 1.00 1.10 1.30
27860.	<b>Filter Paper, C. S. &amp; S., No. 589 "Yellow Ribbon."</b> Washed in hydrochloric and hydrofluoric acid. The filters of this brand are identical with the brand "white ribbon" but after being freed of mineral constituents, they are also treated with ether.
	Diameter mm..... 55 70 90 110 125 150
	Ashes, gram..... .00004 .00007 .00011 .00017 .00021 .00025
	Per 100..... .65 .70 1.05 1.25 1.40 1.65
27864.	<b>Filter Paper, C. S. &amp; S., No. 590.</b> These filters, which are also treated with HCl and HFl are thinner than the brands specified under No. 589. They therefore contain slightly less ash and filter and are slower than No. 589—white ribbon—but otherwise readily retain fine precipitates.
	Diameter mm..... 55 70 90 110 125 150
	Ashes, gram..... .00002 .00003 .00005 .00007 .00009 .00013
	Per 100..... .65 .70 1.05 1.25 1.40 1.65
27868.	<b>Filter Paper, C. S. &amp; S., No. 602,</b> hard or extra hard, a paper of especial density and hardness. The finest particles or precipitates which no other paper can filter are retained. Consequently these papers must not be expected to work quickly and they are recommended for use with an air pump or as folded filters. The "hard" filters are supplied if grade is not specified in ordering. After filtration through these papers the superphosphates are rendered soluble for the purpose of determining the amount of the phosphoric acid soluble in water, and solutions which are to be polarized and impregnated with acetate of lead, become clear at once.
	Diam., mm..... 55 70 90 110 125 150 185 240 270 320 385 500
	Per 100..... .22 .26 .34 .42 .44 .55 .72 1.10 1.45 1.75 2.30 3.50
27872.	<b>Filter Paper, C. S. &amp; S. No. 602,</b> hard or extra hard, in sheets 580 x 580 mm. Per 100..... 4.20
27876.	<b>Filter Paper, C. S. &amp; S. No. 591,</b> an extra heavy and strong paper, specially adapted for the filtration of liquors, fruit juices, syrups and oils, and does not give off any hairs or fuzz to the filtrate. In sheets 580 x 580 mm. Per 100..... 5.80
27880.	<b>Filter Paper, C. S. &amp; S. No. 551,</b> a deep black filtering paper, specially adapted for filtering light colored sediments and for drop reactions of the same nature. These papers are not acted upon by water, alcohol, ether diluted acids or alkalis.
	Diam., mm..... 55 70 90 110 125 150 185
	Per 100..... .22 .26 .34 .42 .44 .55 .70
27884.	<b>Filter Paper, C. S. &amp; S. No. 601,</b> for drop reactions. In sheets 140 x 220 mm. Per 100..... 2.35
27888.	<b>Filters, Folded C. S. &amp; S. No. 580,</b> with parchmentized points to prevent breaking under pressure. Specially recommended for the filtration of molasses, fruit juices, liquors and caustic solutions.
	Diam., mm..... 320 385 500
	Per 100..... 1.40 1.75 2.70
27892.	<b>Filter Cones, C. S. &amp; S. No. 574,</b> consisting of semi-circular discs of No. 575 hardened filter paper, for folding. An excellent substitute for platinum cones.
	Diam., mm..... 55 70 90 110 125 150 185 240
	Per 100..... .42 .46 .62 .76 .85 1.00 1.30 2.00



No. 27900



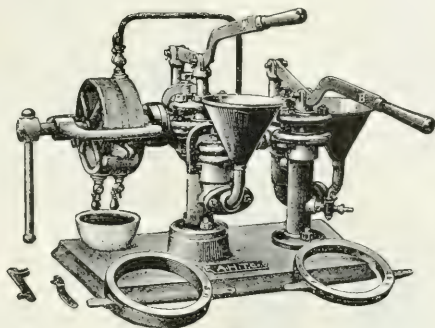
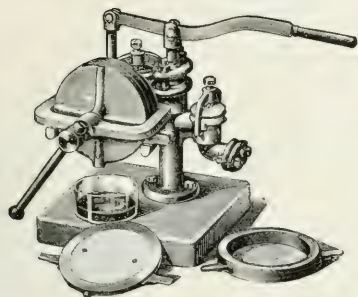
No. 27908



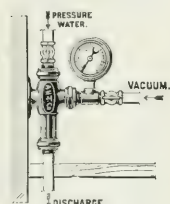
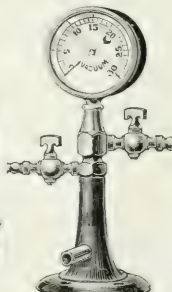
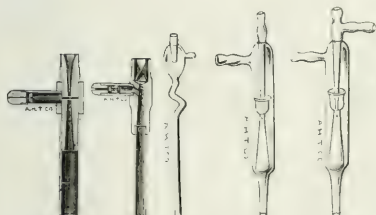
No. 27952

27896. **Filter Paper, Dreverhoff, No. 86**, crimped fast filters, heavy, dense and pure white. These papers filter more rapidly than any other, the filtering surface being increased 60% by the crimping. Specially adapted for sugar work and for filtration in silica determinations.
- |            |     |     |      |      |      |      |     |
|------------|-----|-----|------|------|------|------|-----|
| Diam., mm. | 55  | 70  | 90   | 110  | 125  | 150  | 185 |
| Per 100    | .14 | .20 | .26  | .29  | .33  | .37  | .50 |
| Diam., mm. | 200 | 240 | 320  | 380  | 450  | 500  |     |
| Per 100    | .64 | .81 | 1.31 | 1.83 | 2.51 | 2.84 |     |
27900. **Filter Paper, Dreverhoff, No. 207**, rapid filtering, washed with hydrochloric acid.
- |                        |         |        |        |        |       |        |
|------------------------|---------|--------|--------|--------|-------|--------|
| Diam., mm.             | 55      | 70     | 90     | 110    | 125   | 150    |
| Ash per filter, grams. | 0.00016 | 0.0003 | 0.0005 | 0.0009 | 0.001 | 0.0016 |
| Per 100                | .22     | .27    | .41    | .54    | .65   | .82    |
27904. **Filter Paper, Dreverhoff, No. 400**, washed with hydrochloric and hydrofluoric acids; of very close texture, retaining the finest precipitates. Although very strong, it filters rapidly.
- |                        |         |         |         |         |         |         |
|------------------------|---------|---------|---------|---------|---------|---------|
| Diam., mm.             | 55      | 70      | 90      | 110     | 125     | 150     |
| Ash per filter, grams. | 0.00003 | 0.00006 | 0.00009 | 0.00014 | 0.00018 | 0.00028 |
| Per 100                | .52     | .78     | 1.09    | 1.50    | 1.68    | 1.98    |
27908. **Filter Paper, Dreverhoff, No. 417**, washed twice with hydrochloric and hydrofluoric acids; retains fine precipitates such as barium sulphate, etc.
- |                        |         |        |         |         |         |         |
|------------------------|---------|--------|---------|---------|---------|---------|
| Diam., mm.             | 55      | 70     | 90      | 110     | 125     | 150     |
| Ash per filter, grams. | 0.00002 | 0.0004 | 0.00006 | 0.00009 | 0.00012 | 0.00019 |
| Per 100                | .67     | .95    | 1.34    | 1.73    | 1.96    | 2.28    |
27912. **Filter Paper, Dreverhoff, No. 206**, a superior white paper for general qualitative and pharmaceutical work, retaining fine precipitates.
- |            |     |     |     |     |     |     |     |     |      |      |      |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Diam., mm. | 55  | 70  | 90  | 110 | 125 | 150 | 185 | 240 | 320  | 400  | 500  |
| Per 100    | .13 | .15 | .20 | .23 | .27 | .30 | .38 | .58 | 1.02 | 1.91 | 2.18 |
27916. **Filter Paper, Dreverhoff, No. 206**, in sheets 450 x 450 mm. Per quire. .56
27920. **Filter Paper For Agar, A. H. T. Co. Special**, sometimes designated as "Lautenschlaeger" filter paper. A heavy, white paper with rough surface. Specially recommended for filtering agar and other culture media. In sheets 400 x 400 mm. Per 100. .250
27924. **Filter Paper**, white, so called "bibulous" paper. Per ream 3.00 Per quire .20
27928. **Filter Paper, Chardin**, as used and specially recommended for filtering agar agar in preparation of culture media. The filters are already folded and come in boxes containing 50 of the 32 cm size and 25 of the 50 cm size.
- |               |      |     |
|---------------|------|-----|
| Diameter, cm. | 32   | 50  |
| Per box       | 1.00 | .70 |
27932. **Filter Paper, Chardin**, in sheets 53 cm square. Per 25 sheets. 1.50
27936. **Filter Paper, Prat-Dumas**, white, in sheets, 17 x 21 inches. Per quire. .20 Per ream. 3.50
27944. **Filter Paper, Dialyzing, Morochowetz, C. S. & S.**, a specially cut and folded membrane of parchment paper. They are folded ready for use in funnels from 12° to 15° angle and 250 mm high. No. 521 is thick and No. 522 thin.
- |                   |      |      |
|-------------------|------|------|
| S. & S. number    | 521  | 522  |
| Per package of 25 | 2.70 | 2.00 |
- Note—For Funnel for use with above Dialyzing Filters, see No. 28552.
27948. **Filter Racks**, for holding the filter paper away from the sides of the funnel; made of galvanized iron wire and rubber ring. May be folded to serve as squeezer.
- |                   |     |     |     |     |
|-------------------|-----|-----|-----|-----|
| Diameter, inches. | 5   | 7½  | 9   | 12  |
| Each.             | .30 | .40 | .50 | .75 |
27952. **Filter Paper Box**, of japanned tin, holding five sizes of circular filters from 3 to 7½ inches in diameter. Very convenient in the laboratory as it provides ready access to clean filters at all times. 2.50



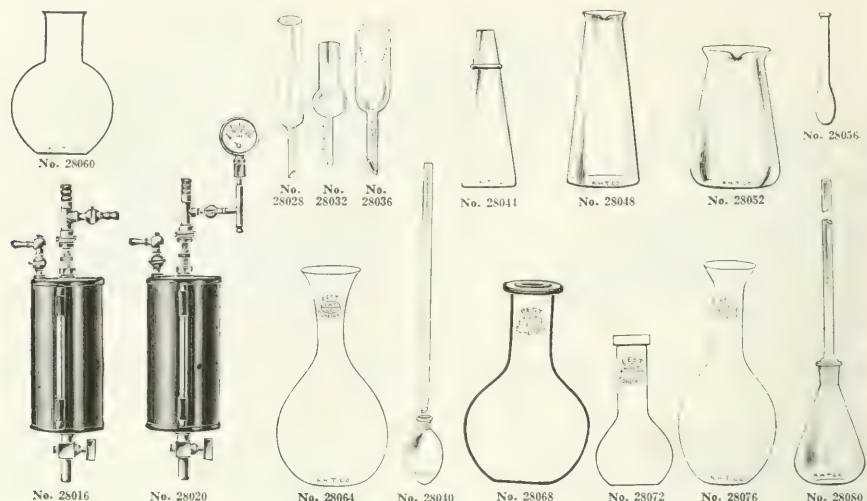


- |        |   |                |        |
|--------|---|----------------|--------|
| 27956. | Filter Press, Laboratory, complete with pressure pump, three filter frames of different thickness and three sets of filter cloths. Exposed filtering surface is 400 sq. cm. Press is of iron on heavy iron base.  | Duty Paid..... | 60.00  |
| 27960. | Filter Press, Laboratory, as above but of bronze  | Duty Paid..... | 80.00  |
| 27964. | Filter Press, Laboratory, with two pumps, one for pumping the material for filtration into the press, the other to pump in the bleaching solution. Complete with three filter frames and three sets of filter cloths. With an exposed filtering area of 400 sq. cm. | Duty Paid..... | 80.00  |
| 27968. | Filter Press, Laboratory, with press and Pump A of bronze and Pump B of iron.   | Duty Paid..... | 120.00 |



- |        |   |               |               |                |
|--------|---|---------------|---------------|----------------|
| 27972. | <b>Filter Pump,</b> Chapman, of polished brass. For operation under ordinary water pressure either on faucet or directly connected to water supply pipe. Length, inches.....  | $\frac{3}{8}$ | $\frac{4}{7}$ | $\frac{5}{16}$ |
|        | Each.....   | 1.35          | 1.75          | 2.00           |
| 27976. | <b>Filter Pump Couplings,</b> of brass, with faucet thread. Style and size of filter pump must be given when ordering.....  |               |               | .35            |
| 27980. | <b>Filter Pump Couplings,</b> of brass, for connecting with faucet without threads. Style and size of filter pump must be given in ordering.....  |               |               | .55            |
| 27984. | <b>Filter Pump,</b> of brass. New patent form. More efficient than the Chapman.<br>Length, inches.....  | $\frac{3}{8}$ | $\frac{4}{7}$ | $\frac{5}{16}$ |
|        | Each.....   | 1.35          | 1.75          | 2.00           |
| 27988. | <b>Filter Pump,</b> Geissler, of glass.....   |               |               | .80            |
| 27992. | " " Muencke, of glass, with one suction tube.....   |               |               | 1.25           |
| 27996. | " " " two " " " " .....   |               |               | 1.50           |
| 28000. | <b>Filter Pump,</b> Richards, of brass. A very powerful pump.<br>Length, inches.....<br>Size pipe fitting thread, inches.....<br>Each.....  | $\frac{7}{8}$ | $\frac{7}{8}$ | 13             |
|        |   | 1.25          | 2.00          | 7.50           |
| 28004. | <b>Filter Pump,</b> On Base, with stopcocks for water and air connections.....  |               |               | 10.00          |
| 28008. | <b>Filter Pump,</b> Water Jet Form, displacing $\frac{1}{2}$ cu. ft. of air per minute with 20 lbs. water pressure. Will exhaust a 1 gallon vessel to a vacuum of 29 $\frac{1}{2}$ inches of mercury in 10 min. with a 10 lbs. water pressure and in 5 min. with a 20 lbs. water pressure. Very useful for filtrations, percolations and distillations in laboratory work. Complete with vacuum gauge, connecting tee and two stop-cocks..... |               |               | 12.00          |
| 28012. | <b>Filter Pump,</b> as above but for operating by steam instead of water, with steam connections....  |               |               | 12.00          |





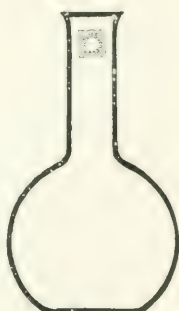
28016.	Filter Pump, for both suction and pressure; with metal reservoir. Filter pump is removable. Stop-cocks and fittings are nickel plated and reservoir is of zinc finished in bronze lacquer.	8.00
28020.	Filter Pump, as above, with manometer.	15.00
28024.	Metal Band for either of above, with holes to conveniently screw to wall.	.50
28028.	Filter Tubes, for filtering through asbestos, glass wool or glass powder.	
	Length, mm.	150 200
	Each.	.10 .15
28032.	Filter Tube, Fresenius, with bulb, 20 mm inside diameter at top.	.20
28036.	Filter Tubes, for use with Gooch, Alundum and similar crucibles. Tube of 32 mm inside diameter is suitable for Gooch crucible No. 25294, 25 cc or Alundum crucible No. 25266, 25 cc. Rubber tubing suitable for making air-tight connection with Gooch crucible is listed under No. 46236.	
	Inside diameter at top, mm.	18 20 25 28 32 37 40
	Each.	.18 .20 .22 .25 .30 .35 .40
28040.	Flask, Acetylation, with ground in condensing tube, as used in determining menthol in oil of peppermint, etc.	1.25
28044.	Flasks, Assay, Best Bohemian Glass. Capacity, cc.	50 100 250
	Each.	.15 .18 .20
28048.	Flasks, Assay, Best Bohemian Glass, conical high form, with narrow mouth and spout.	
	Capacity, cc.	50 100 250 500
	Each.	.15 .20 .25 .30
28052.	Flasks, Assay, Best Bohemian Glass, conical wide form, with spout.	
	Capacity, cc.	50 100 250 500
	Each.	.15 .20 .25 .30
28056.	Flasks, Assay, Best Bohemian Glass, pear shape, with long neck.	
	Capacity, cc.	50 100 250
	Each.	.12 .15 .25
28060.	Flasks, Best Bohemian Glass; light weight, low form, with extra wide mouth and flat bottom, so-called Carbonic Acid flasks.	
	Capacity, cc.	25 50 100 150 250
	Each.	.10 .12 .15 .20 .25
28064.	Flask, for Copper Determinations, with flaring neck.	
	Capacity, cc.	180 250
	Each.	.20 .25
28068.	Flasks, Joliet, much heavier than boiling flasks but made to stand heat; as used in iron and steel analyses.	
	Capacity, cc.	50 100 2000
	Each.	.25 .35 .60
28072.	Flasks, Johnson, for Sulphur Determination, for use in iron and steel analysis. With heavy ring neck, taking a No. 6 rubber stopper, capacity 275 cc to base of neck; height 165 mm.	.25
28076.	Flasks, Low, for Copper Determination; cylindrical neck with flaring top.	
	Capacity, cc.	125 250
	Each.	.18 .30
28080.	Flasks, Soil Analysis, of Jena Glass, with long condenser tube ground in with air tight joint.	
	Capacity, cc.	200 500
	Each.	1.60 2.00



<b>28084. Flasks, Best Bohemian Glass, flat bottom, vial mouth, with uniform necks.</b>											
Capacity, cc.....	25	50	100	150	200	250	300	400	500	750	
To take stopper No.....	0	1	2	3	3	4	4	5	5	6	
Each.....	.07	.08	.10	.12	.14	.16	.17	.18	.20	.25	
Capacity, cc.....	1000	1500	2000	3000	4000	6000	8000	12000	20000		
To take stopper No.....	6	7	9	10	10	10	10	11	13		
Each.....	.30	.35	.45	.60	.80	1.00	1.50	2.00	3.50		
<b>28088. Flasks, Best Bohemian Glass, flat bottom with heavy ring neck.</b>											
Capacity, cc.....	25	50		100	150	200	250	300	400		
To take stopper No.....	0	1		2	3	3	4	4	5		
Each.....	.07	.08		.10	.12	.14	.16	.17	.18		
Capacity, cc.....	500	750		1000	1500	2000	3000	4000			
To take stopper No.....	5	6		6	7	7	9	10	10		
Each.....	.20	.25		.30	.35	.45	.60	.80			
<b>28092. Flasks, Best Bohemian Glass, round bottom, with vial mouth.</b>											
Capacity, cc.....	50	100	250	500	750	1000	1500	2000	4000		
To take stopper No.....	1	2	4	5	6	6	7	9	10		
Each.....	.08	.10	.16	.20	.25	.30	.35	.45	.80		
<b>28096. Flasks, Whitall Tatum "Nonsol" Glass, flat bottom, with vial mouth. Very insoluble in water, alkalis and acids and specially recommended for uniformity of shape. By special arrangement with the manufacturer we are enabled to offer these Flasks for immediate shipment from our own stock at original net factory prices.</b>											
Capacity, cc.....	60	120	180	250	500	1000	2000	4000	8000	12000	
To take stopper No.....	1	2	3	4	5	6	7	9	10		
Each.....	.11	.13	.14	.15	.20	.28	.45				
<b>28100. Flasks, Whitall Tatum Regular Glass, flat bottom, vial mouth, widely used in industrial laboratories because of their uniform shape which is identical with the illustration of "Nonsol." By special arrangement with the manufacturers we are enabled to offer these Flasks for immediate shipment from our stock at original net factory prices.</b>											
Capacity, cc.....	30	60	120	180	250	500	1000	2000	4000	8000	12000
Each.....	.08	.09	.10	.11	.12	.15	.23	.35	.75	1.25	2.00
<b>28104. Flasks, Wash Bottle, with stout ring neck to withstand corking. The heavy wall of these flasks makes them much more durable under mechanical stress than the ordinary boiling flask.</b>											
Capacity, cc.....	250	500		1000	2000	4000	8000	12000			
To take stopper No.....	3	5		6	7	9	10				
Each.....	.15	.20		.35	.50						
<b>28108. Flasks, Opaque Fused Silica. These flasks are sufficiently transparent to enable the level of a liquid to be determined. They are furnished with either round or flat bottom and are admirably adapted for direct heating by electric resistance wires for boiling at high temperatures, etc.</b>											
Capacity, cc.....	50	100	150	200	250	500	1000				
Each.....	2.75	4.00	4.25	5.00	6.25	7.50	16.00				
<b>28112. Flasks, New Jena Glass, round bottom, with vial mouth. See illustration on following page.</b>											
Capacity, cc.....	50	100	150	200	250	500	1000				
To take stopper No.....	1	3	3	4	5	5					
Each.....	.11	.12	.14	.16	.19	.23					
Capacity, cc.....	500	700	1000	1500	2000	3000					
To take stopper No.....	5	6	7	8	9	10					
Each.....	.26	.32	.38	.45	.53	.68					



No. 28112



No. 28116



No. 28120



No. 28124

28116.	Flasks, New Jena Glass, flat bottom with vial mouth.								
	Capacity, cc.....	50	100	150	200	300	400		
	To take stopper No.....	0	0	1	2	4	4		
	Each.....	.11	.12	.14	.16	.19	.23		
	Capacity, cc.....	500	700	1000	1500	2000	3000		
	To take stopper No.....	6	6	7	7	8	9		
	Each.....	.26	.32	.38	.45	.53	.68		
28120.	Flasks, New Jena Glass, flat bottom, with heavy ring neck.								
	Capacity, cc.....				500	1000	2000		
	To take stopper No.....				6	7	8		
	Each.....				.32	.46	.63		
28124.	Flasks, New Jena Glass, round bottom, with short ring neck.								
	Capacity, cc.....	50	100	150	200	300	400	500	700
	To take stopper No.....	0	2	3	3	4	5	6	6
	Each.....	.13	.14	.16	.19	.23	.28	.32	.38
	Capacity, cc.....	1500	2000	3000	4000	5000	6000	8000	10000
	To take stopper No.....	9	9	10	10	11	11	12	12
	Each.....	.55	.63	.80	.93	1.05	1.40	1.90	2.50
28128.	Flasks, New Jena Glass, round bottom with long ring neck. Prices and sizes same as for No. 28124.								



No. 28140



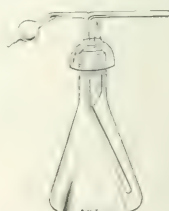
No. 28144



No. 28148

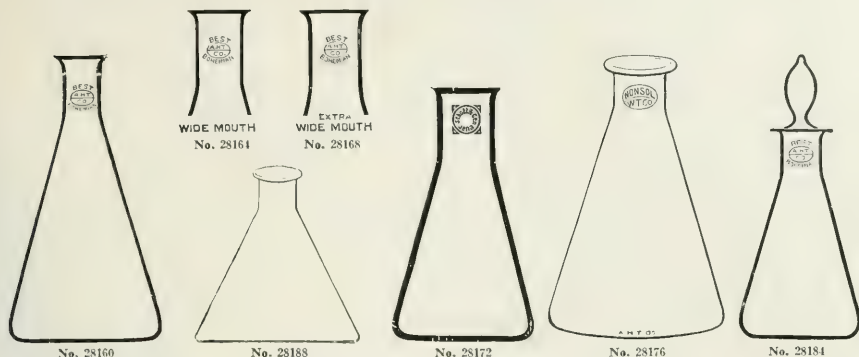


No. 28152



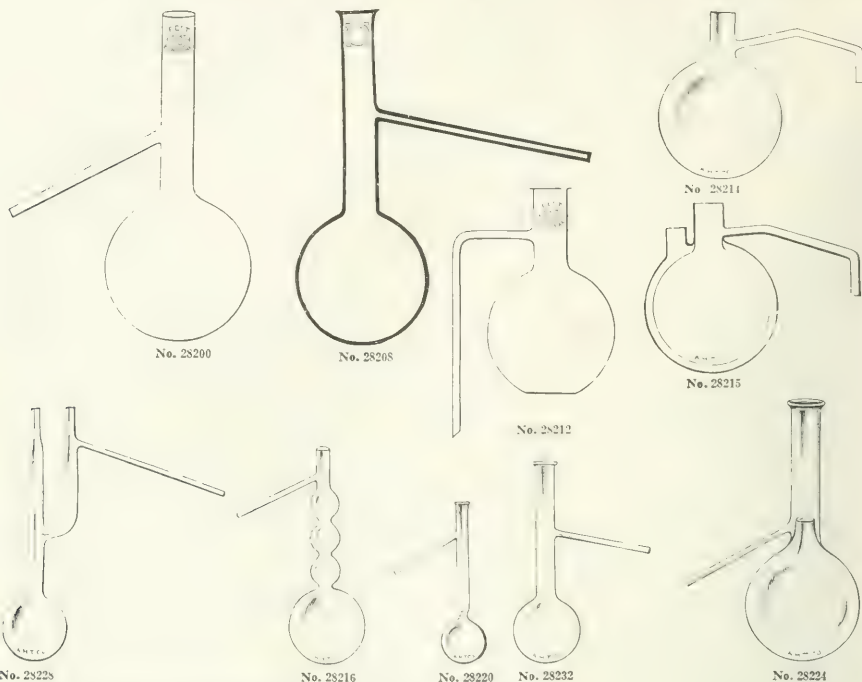
No. 28156

28140.	Flasks, for Iodine Determinations; with wide, flaring funnel shaped lip and hollow, ground in stopper fitted to neck.			
	Capacity, cc.....	125	250	500
	Each.....	.60	.75	1.00
28144.	Flasks, Copper Oxide, for storing CuO in organic analyses.			
	Capacity, cc.....	125	250	500
	Each.....	.55	.65	.85
28148.	Flasks, Copper, polished, with ring neck.			
	Capacity, cc.....	250	500	1000
	Each.....	1.75	2.00	2.50
28152.	Flasks, Copper, polished, as used for Kjeldahl determinations; 4 inches high, 8 1/2 inches diameter, capacity 1000 cc.....			3.30
28156.	Flask, Orlovius, for the sterile drawing and handling of blood for bacteriological purposes, fitted with a ground in glass stopper with two tubulations and a protecting cap.....			2.50



<b>28160. Flasks, Erlenmeyer, Best Bohemian Glass, with narrow mouth.</b>												
Capacity, cc.....	25	50	100	150	200	250	300	400	500	750		
To take stopper No.....	0	1	2	3	3	4	4	5	5	6		
Each.....	.07	.08	.10	.12	.14	.16	.17	.18	.20	.25		
Capacity, cc.....					1000	1500	2000	3000	4000			
To take stopper No.....					6	7	7	9	9			
Each.....					.30	.35	.45	.60	.80			
<b>28164. Flasks, Erlenmeyer, Best Bohemian Glass, with wide mouth.</b>												
Capacity, cc.....	25	50	100	150	200	250	300	400				
To take stopper No.....	1	2	3	4	4	5	5	6				
Each.....	.07	.08	.10	.12	.14	.16	.17	.18				
Capacity, cc.....		500	750	1000	1500	2000	3000	4000				
To take stopper No.....		6	7	7	8	9	11	12				
Each.....		.20	.25	.30	.35	.45	.60	.80				
<b>28168. Flasks, Erlenmeyer, Best Bohemian Glass, with extra wide mouth.</b>												
Capacity, cc.....					100	250	500	1000				
Each.....					.10	.16	.20	.30				
<b>28172. Flasks, Erlenmeyer, New Jena Glass.</b>												
Capacity, cc.....	25	50	100	150	200	250	300	500				
To take stopper No.....	00	1	3	4	5	5	6	6				
Each.....	.09	.10	.11	.12	.13	.15	.17	.24				
Capacity, cc.....		600	750	1000	1500	2000	3000	4000	5000			
To take stopper No.....		6	7	8	9	10	10	10	10			
Each.....		.26	.29	.37	.45	.53	.65	.85	1.00			
<b>28176. Flasks, Erlenmeyer, Whittall Tatum Nonsol Glass. Very insoluble in water, alkalis and acids, and specially recommended for uniformity of shape. By special arrangement with the manufacturers we are enabled to offer these flasks for immediate shipment from our stock at original net factory prices.</b>												
Capacity, cc.....	60	120	180	250	500	1000	2000					
To take stopper No.....	6	5	3	4	5	6	8					
Each.....	.11	.13	.14	.15	.20	.30	.50					
<b>28180. Flasks, Erlenmeyer, Whittall Tatum Regular Glass, widely used in industrial laboratories because of their uniform shape, which is exactly similar to the Nonsol above listed. By special arrangement with the manufacturers we are enabled to offer these flasks for immediate shipment from our stock at original net factory prices.</b>												
Capacity, cc.....	60	120	180	250	500	700	1000	2000				
Each.....	.09	.10	.11	.12	.14	.15	.20	.23	.38			
<b>28184. Flasks, Erlenmeyer, Best Bohemian Glass, with ground in glass stopper.</b>												
Capacity, cc.....	125	250	500	1000								
Each.....	.50	.65	.85	1.25								
<b>28188. Flasks, Erlenmeyer, with very flat, extra wide base, specially constructed for boiling on electric hot plates and for culture flasks.</b>												
Capacity, cc.....		250	500	1000								
Each.....		.18	.24	.45								





No. 28223

No. 28216

No. 28220

No. 28232

No. 28224

28192.	Flasks, Distillation, Best Bohemian Glass, with side tube high on neck.						
	Capacity, cc.....	30	60	100	250	500	1000 2000
	Each.....	.15	.20	.25	.30	.50	.65 1.00
28196.	Flasks, Distillation, Best Bohemian Glass, with side tube at center of neck.						
	Capacity, cc.....	30	60	100	250	500	1000 2000
	Each.....	.15	.20	.25	.30	.50	.65 1.00
28200.	Flasks, Distillation, Best Bohemian Glass, with side tube low on neck.						
	Capacity, cc.....	30	60	100	250	500	1000 2000
	Each.....	.15	.20	.25	.30	.50	.65 1.00
28204.	Flasks, Distillation, Best Bohemian Glass, with side tube 400 mm long at center of neck.						
	Capacity, cc.....				100	250	500 1000
	Each.....				.30	.40	.60 .75
28208.	Flasks, Distillation, New Jena Glass, with side tube at center of neck.						
	Capacity, cc.....	50	100	200 300	500	1000 1500	2000 3000
	Each.....	.22	.24	.29 .34	.45	.65	.78 1.00 1.25
28212.	Flask, Distillation, Best Bohemian Glass, with side tube bent down at right angle. So-called "sulphur" flask. Capacity 500 cc.....						.60
28214.	Flask, Glass, for use with the official Brown-Duvel Moisture Tester. See Bulletin 56 of the U. S. Bureau of Plant Industry.....						.75
28215.	Flask, Copper, Double Wall, for use with the official Brown-Duvel Moisture Tester when same is used for moisture determinations in flour and ground grain substances in which the copper flask is used in place of the glass flask. See Bulletin 56 of the U. S. Bureau of Plant Industry.....						5.00
28216.	Flask, Distillation, Ladenburg, with three bulbs in neck. Capacity 500 cc.....						.80
28220.	Flask, Distillation, Hempel, as used in the U. S. Department of Agriculture, Forest Service, for the distillation of creosote. Capacity 500 cc.....						.80
28224.	Flasks, Distillation, Lunge, with trap in neck. Capacity, cc.....					125	250 500
	Each.....					.60	.70 .90
28228.	Flasks, Distillation, Claisen. Capacity, cc.....				50	100	250 500
	Each.....				.50	.60	.75 1.00
28232.	Flasks, Distillation, Engler, as used in the coal tar industry. Made to exact dimensions.						
	Capacity, cc.....						100 250
	Each.....					.30	.40
28236.	Flask, Distilling, Engler, Semi-transparent Silica, for use in distillation above 300° C.....						5.00
28240.	Flask, Opaque Fused Silica, with side arm for distillations.						
	Capacity, cc.....	50	100	150	200	250	500 1000
	Each.....	3.25	4.75	5.00	6.00	7.50	9.00 18.50



No. 28244



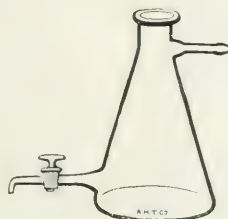
No. 28248



No. 28252



No. 28256



No. 28260

28244.	Flasks, Filtering, Erlenmeyer shape, of heavy glass to withstand pressure.					
	Capacity, cc.....	250	500	1000	2000	
	Each.....	.25	.40	.60	.75	
28248.	Flasks, Filtering, same as No. 28244 but with side neck.					
	Capacity, cc.....	250	500	750	1000	2000
	Each.....	.35	.45	.50	.60	1.00
28252.	Flasks, Filtering, same as No. 28248 but with side neck and glass stopcock.					
	Capacity, cc.....	250	500	1000	2000	4000
	Each.....	1.25	1.50	2.50		
28256.	Flasks, Filtering, Erlenmeyer shape, of heavy glass, with side neck and tubulation at bottom at opposite side to take ordinary stopper.					
	Capacity, cc.....	500	1000	2000		
	Each.....	.90	1.20	2.00		
28260.	Flasks, Filtering, Erlenmeyer shape, of heavy glass, with side tube at neck and in addition tubulation with stopcock on opposite side near bottom. Capacity 1000 cc.....					2.00



No. 28264



No. 28268

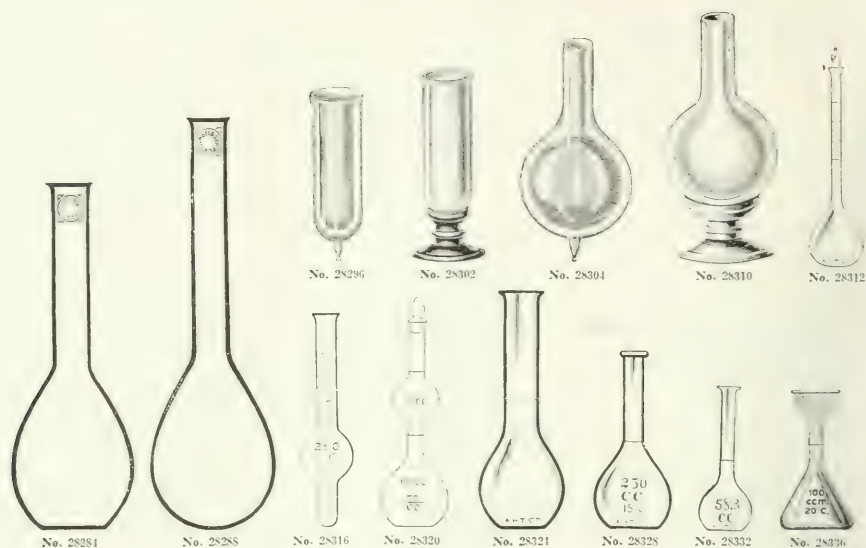


No. 28272



No. 28276

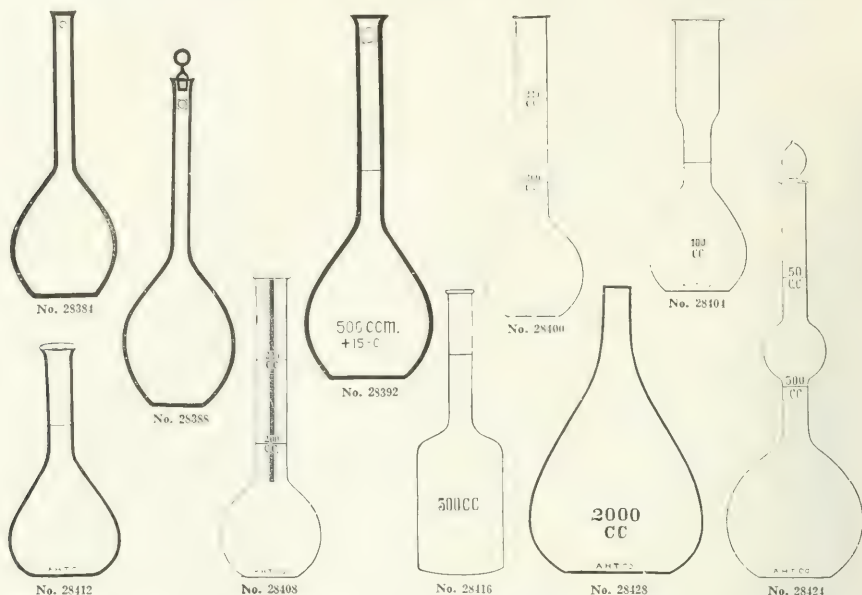
28264.	Flask, Filtering, as above, but with ground in stopcock in lower tubulation.			
	Capacity, cc.....	500	1000	2000
	Each.....	1.50	2.00	2.50
28268.	Flasks, Filtering, Erlenmeyer shape, of heavy glass, with side tube and with funnel ground into neck.			
	Capacity, cc.....	500	1000	
	Each.....	2.00	2.75	
28272.	Flask, filtering, with side tubulation and funnel shaped neck into which the filtering funnel may be tightly fitted by means of a heavy rubber ring. Price does not include glass funnel or rubber ring.			
	Capacity of flask, cc.....	500	1000	2000
	Each.....	.60	1.00	1.50
28273.	Rubber Rings, each.....			.15
28276.	Flasks, Kjeldahl, Whitall-Tatum, Nonsol Glass, very insoluble in water, alkalis and acids. Specially recommended for uniformity of shape. By special arrangement with the manufacturer we are enabled to offer these Flasks for immediate shipment from our stock at original net factory prices.			
	Capacity, cc.....	500	800	
	Height, mm.....	300	280	
	Diameter of body, mm.....	100	110	
	Each.....	.30	.35	



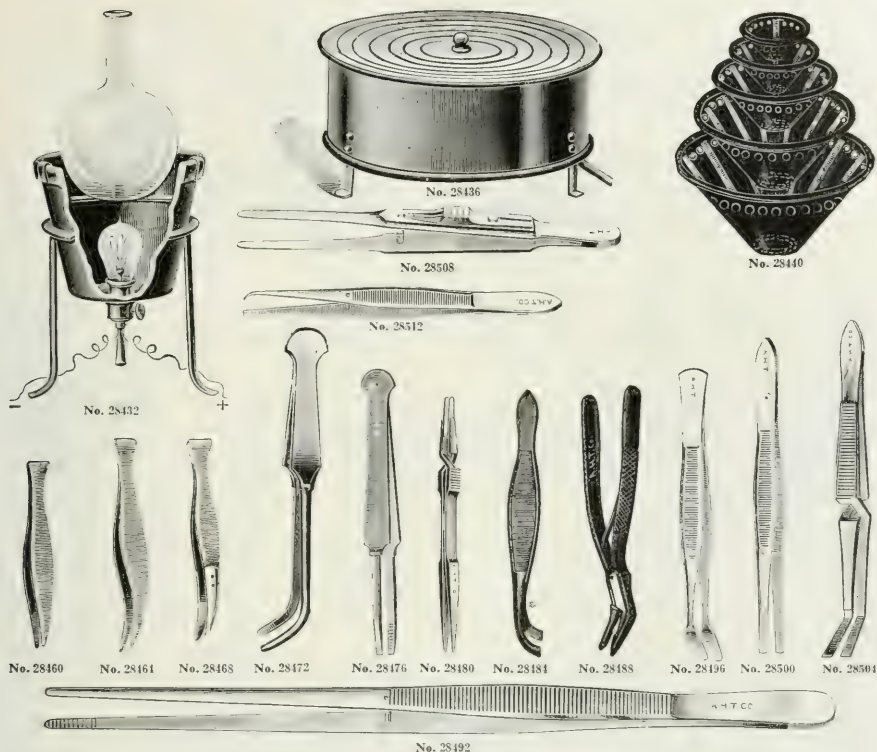
28280.	Flasks, Kjeldahl, New Jena Glass, round bottom, short neck.									
	Capacity, cc.....	50	100	200	300	500	800	1000	1500	2000
	Each.....	.13	.14	.18	.22	.30	.35	.45	.55	.63
28284.	Flasks, Kjeldahl, New Jena Glass, flat bottom, short neck.									
	Capacity, cc.....	50	100	200	300	500	800	1000	1500	2000
	Each.....	.13	.14	.18	.22	.30	.35	.45	.55	.63
28288.	Flasks, Kjeldahl, New Jena Glass, round bottom, long neck.									
	Capacity, cc.....	50	100	200	300	500	800	1000	1500	2000
	Each.....	.14	.15	.20	.25	.33	.40	.50	.63	.70
28292.	Flasks, Kjeldahl, New Jena Glass, flat bottom, long neck.									
	Capacity, cc.....	50	100	200	300	500	800	1000	1500	2000
	Each.....	.14	.15	.20	.25	.33	.40	.50	.63	.70
28296.	Flasks, Vacuum, Dewar, tube form, for liquid air, without base and unsilvered.									
	Length outside, mm.....							100		250
	Outside diameter, mm.....							45		60
	Inside diameter, mm.....							30		40
	Each.....							2.00		4.50
28300.	Flasks, Vacuum, as above, but silvered.....							2.50		5.00
28302.	Support for either of above.....									.75
28304.	Flasks, Vacuum, Dewar, pear shaped, for liquid air, unsilvered.									
	Capacity, cc.....				150	300	500	1000		
	Each.....				2.50	3.00	4.00	6.50		
28308.	Flasks, Vacuum, as above, silvered.....				3.00	3.50	4.75	7.25		
28310.	Support, only, for above flasks.....				1.00	1.00	1.50	1.50		
28312.	Flask, Cassia, with graduated neck and glass stopper. Capacity 120 cc, neck graduated to 10 cc in 10ths.									1.50
28316.	Flask, Volumetric, with graduations above and below bulb, for saponification method of determining total fatty acid in cotton seed and similar products.....									1.50
28320.	Flask, Volumetric, for the determination of unsaponifiable fats, capacity of lower bulb 100 cc, with mark indicating 50 cc; capacity of upper bulb 30 cc; with ground glass stopper and graduated to contain.....									1.10
28324.	Flask, Volumetric, for insoluble phosphoric acid determinations, with wide neck 25 mm inside diameter, capacity of flask 200 cc, of stout glass.....									.40
28328.	Flask, Volumetric, for fertilizer work, 250 cc capacity, with short neck, of heavier glass than regular volumetric flask and with mark low on neck.....									.50
28332.	Flask, Volumetric, as used in the analysis of feed water for boilers, particularly in determining the alkalinity, etc.; accurately graduated to deliver 58.3 cc.....									.35
28336.	Flask, Volumetric, conical shape with enlarged mouth, 100 cc capacity. As used in oil analysis.....									.75







28384. Flasks, Volumetric, New Jena Glass, without stoppers and without graduation. The indicated capacity falls near the middle of the neck.
- |                   |     |     |     |     |     |     |     |     |      |      |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Capacity, cc..... | 50  | 100 | 125 | 200 | 250 | 300 | 500 | 750 | 1000 | 2000 |
| Each.....         | .17 | .18 | .19 | .24 | .29 | .33 | .42 | .50 | .55  | .78  |
28388. Flasks, Volumetric, New Jena Glass, same as No. 28384 but with glass stoppers.
- |                   |     |     |     |     |     |     |     |     |      |      |
|-------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Capacity, cc..... | 50  | 100 | 125 | 200 | 250 | 300 | 500 | 750 | 1000 | 2000 |
| Each.....         | .38 | .39 | .40 | .48 | .53 | .58 | .73 | .83 | .90  | 1.15 |
28392. Flasks, Volumetric, New Jena Glass, without stoppers. Graduated to contain.
- |                   |     |     |     |     |     |     |     |      |      |      |
|-------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Capacity, cc..... | 50  | 100 | 125 | 200 | 250 | 300 | 500 | 750  | 1000 | 2000 |
| Each.....         | .50 | .53 | .55 | .60 | .70 | .75 | .85 | 1.00 | 1.15 | 1.40 |
28396. Flasks, Volumetric, New Jena Glass, same as No. 28392 but with glass stoppers.
- |                   |     |     |      |      |
|-------------------|-----|-----|------|------|
| Capacity, cc..... | 125 | 250 | 500  | 1000 |
| Each.....         | .77 | .94 | 1.16 | 1.50 |
28400. Flasks, Sugar, with two graduations and without stoppers.
- |                   |           |             |             |
|-------------------|-----------|-------------|-------------|
| Capacity, cc..... | 50 and 55 | 100 and 110 | 200 and 220 |
| Each.....         | .28       | .35         | .50         |
28404. Flasks, Sugar, Kohlrausch, with enlarged mouth.
- |                   |     |     |       |       |       |
|-------------------|-----|-----|-------|-------|-------|
| Capacity, cc..... | 100 | 200 | 200.6 | 201.2 | 201.4 |
| Each.....         | .40 | .65 | .65   | .65   | .65   |
28408. Flasks, Sugar, with dark blue enameled stripe on white enameled background.
- |                   |           |             |             |
|-------------------|-----------|-------------|-------------|
| Capacity, cc..... | 50 and 55 | 100 and 110 | 200 and 220 |
| Each.....         | .40       | .50         | .70         |
28412. Flask, Sugar, Bates, 100 cc capacity, pear shape with flaring top. .60
28416. Flasks, Volumetric, Stohmann, of heavy glass for shaking, graduated to contain, without stopper.
- |                   |     |     |      |
|-------------------|-----|-----|------|
| Capacity, cc..... | 250 | 500 | 1000 |
| Each.....         | .60 | .80 | 1.00 |
28420. Flasks, Volumetric, Stohmann, as above, with glass stopper.
- |                   |     |      |      |
|-------------------|-----|------|------|
| Capacity, cc..... | 250 | 500  | 1000 |
| Each.....         | .75 | 1.00 | 1.20 |
28424. Flasks, Volumetric, Giles, with glass stopper and two graduations. When used for making normal solutions the 10% extra volume in the neck of the flask is used for ascertaining exact titration, leaving a volume equal to the exact capacity of flask, for correction.
- |                   |        |          |          |
|-------------------|--------|----------|----------|
| Capacity, cc..... | 500/50 | 1000/100 | 2000/200 |
| Each.....         | 1.75   | 2.40     | 3.50     |
28428. Flasks, Watering, as used in the determination of water requirement of plants. This flask is of special shape and of exactly 2000 cc capacity when filled even with the ground rim, there being no other mark on the flask. This feature enables them to be quickly filled by total immersion and insures delivery of the exact amount of water when placed in a vertical position over the pot, as illustrated in Bulletin 284 of the U. S. Department of Agriculture, Bureau of Plant Industry. .... 1.50



28432. **Flask Heater**, heated by electric incandescent lamp, for conducting ether and similar distillations without danger. On support, with connecting cord but without flask. Will accommodate a 1000 cc flask. 4.00
28436. **Flask Heater, Electric**, of copper, with convenient ring top. Diameter  $8\frac{1}{2}$  inches, height 4 inches. Furnished with three heats, regulating switch, 6 ft. of cord and switch for connecting. Requires 500 watts. Works equally well on direct or alternating current but voltage must be specified in ordering. 12.00
28440. **Flask Heaters**, of sheet iron, with ventilating openings and asbestos inset.
- | Diameter, mm. | 110 | 130 | 180 | 220  | 270  |
|---------------|-----|-----|-----|------|------|
| Each.         | .60 | .75 | .90 | 1.10 | 1.25 |
28460. **Forceps**, of brass, straight. .15
28464. " " bent. .18
28468. " " with ivory tips. .70
28472. " " nickel plated, so-called Goosenecks. Will not corrode; 150 mm long. .50
28476. " " steel, plain. Length, mm.
- | Length, mm. | 100 | 112 | 125 | 150 |
|-------------|-----|-----|-----|-----|
| Each.       | .10 | .12 | .15 | .20 |
28480. **Forceps, Blowing**. French form,  $5\frac{1}{2}$  inches long, with heavy platinum tips. 5.00
28484. **Forceps, Pinning** regular style. .75
28488. " " Blake. 1.75
28492. **Forceps**, of steel nickel plated; For removing specimens from deep jars or bottles.
- | Length, mm. | 250  | 300  | 375  | 450  |
|-------------|------|------|------|------|
| Each.       | 1.25 | 1.50 | 2.00 | 2.50 |
28496. **Forceps, Cover Glass**, with flat, bent blades, 105 mm long. .50
28500. " " " with thin, straight blades and guide pin, 115 mm long. .50
28504. " " " with thin, bent, flat blades; self-closing; 125 mm long. .75
28508. " " " Ehrlich, with long, flat blades and locking device; 135 mm long. 1.25
28512. **Forceps, Cover Glass, Novy**, with flat lower blade and curved, pointed upper blade. Nickel plated. 115 mm long. .50



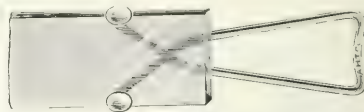
No. 28520



No. 28532



No. 28521



No. 28536



No. 28528



No. 28540



No. 28516



No. 28544



No. 28548



No. 28556



No. 28560



No. 28564

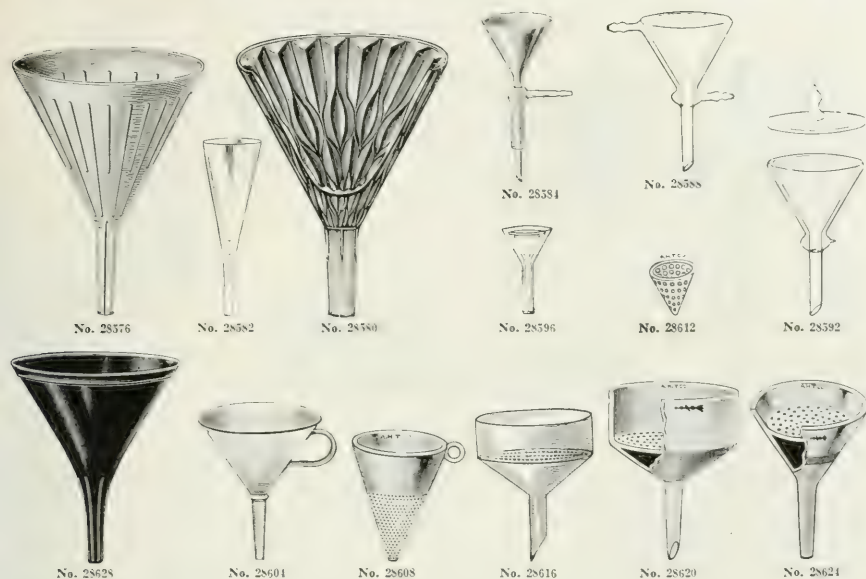


No. 28568



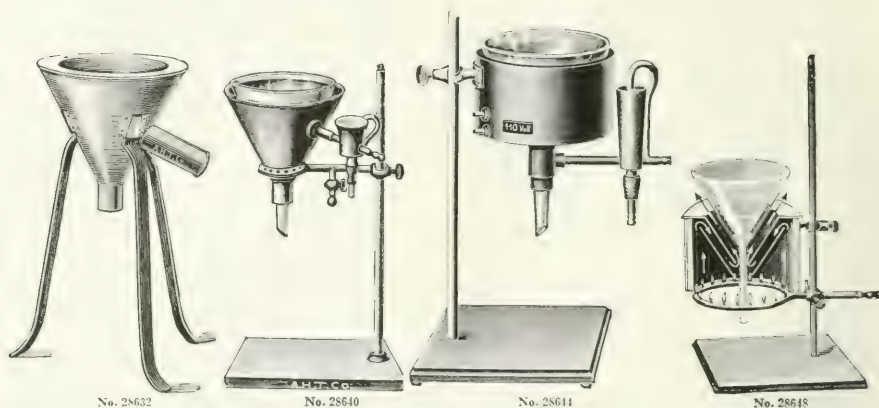
No. 28572

28516.	Forceps, Cover Glass, Novy, same as No. 28512 but with locking device.....	1.00
28520.	“ “ “ Cornet, of spring brass, nickel plated, self-closing, 120 mm long.....	.45
28524.	“ “ “ and Slide, with weight to increase stability.....	1.00
28528.	“ “ “ Stewart, original form, of nicked spring wire, self-closing.....	.10
28532.	“ “ “ same as No. 28528 but with ring to hold jaws together.....	.08
28536.	“ “ Slide, Kirkbride.....	.10
28540.	“ “ Boston.....	.25
28544.	Funnels, Glass, with angle of 60° and stem ground to point.	
	Diameter, mm.....	25 40 50 65 75 90 100
	Each.....	.07 .09 .09 .10 .12 .15 .18
	Diameter, mm.....	120 150 170 200 225 250 300
	Each.....	.20 .30 .35 .50 .65 .90 1.35
28548.	Funnels, Glass, Bunsen, with an exact angle of 60° and with long, thin stems (sizes up to 100 mm diameter have stems about 100 mm long) ground to point and with ground rim. This is an accurate funnel and is not to be confused with the ordinary funnel which we list under No. 28544.	
	Diameter, mm.....	25 40 50 65 75 90 100 110 120 150
	Each.....	.10 .10 .12 .15 .16 .18 .22 .25 .30 .40
28552.	Funnels, Glass, Special, exactly as above but with extra long, thin stems.	
	Diameter, mm.....	50 65 75 90 100
	Each.....	.15 .18 .20 .25 .30
28556.	Funnel, Glass, exactly as above but with capillary bore for perfect suction.	
	Diameter, mm.....	50 65 75 90 100
	Each.....	.15 .18 .20 .25 .30
28560.	Funnels, without stem, as used in sugar analysis. Diameter, mm.....	70 90 100
	Each.....	.15 .20 .25
28564.	Funnels, Glass, with short, wide stem; so-called powder funnels.	
	Diameter, mm.....	60 80 100
	Diameter of stem, mm.....	14 16 18
	Each.....	.20 .25 .30
28568.	Funnels, Glass, with bulb, for filtering through glass wool. Diameter, mm.....	100 150
	Each.....	.30 .45
28572.	Funnels, Victor-Meyer, to suspend over evaporating dishes. Diameter, mm.....	160 200 260
	Each.....	1.00 1.20 1.60

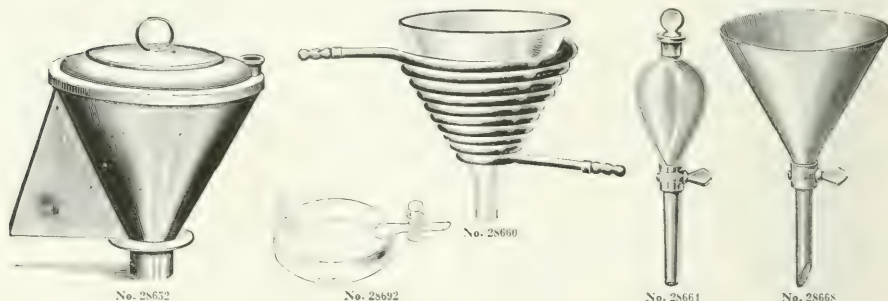


28576.	Funnels, Ribbed, for quick filtering. Of heavy pressed glass with finished rim.								
	Diameter, inches.	2½	3½	4½	5½	7½	8½	10½	13
	Each.....	.10	.12	.15	.18	.25	.40	.75	1.50
28580.	Funnels, Glass, with diagonal fluting, for very rapid filtering. Particularly recommended for use with our special filter paper No. 27920 in filtering agar agar for culture media.								
	Diameter, mm.....	70	100	160	200	240			
	Each.....	.25	.50	.70	1.45	2.25			
25582.	Funnel for use with Morochowetz dialyzing filters, with very accurate angle 12°-15°, and 250 mm high.								.75
28584.	Funnels, Vogel, with side tubulation for suction. Diameter, mm.....	80	90	105					
	Each.....	.75	.90	1.00					
28588.	Funnels, Double Walled, for either hot or cold filtrations, with inlet and outlet tube, 100 mm in diameter.								3.00
28592.	Funnels, Double Walled, with exhaust and silvered lid, 100 mm in diameter.								6.50
28596.	Funnels, set of three for delivering minute quantities; ¼, 1 and 1½ inch in diameter. Per set.....								.25
28600.	Funnels, Copper, with ribs, 4 inches in diameter. Without stem.....								.75
28604.	Funnels, Aseptic Enamel Ware. Of seamless steel, white enameled, both acid and fire proof. With handle. Diameter, inches.....	3	4½	6	8				
	Each.....	.35	.50	.75	1.00				
28608.	Funnels, Porcelain, with perforated sides, 160 mm in diameter.....								1.20
28612.	“ “ small size, for use as filter cones. Diameter, mm.....	45	65						
	Each.....	.25	.35						
28616.	Funnels, Porcelain, Buchner, with fixed perforated, porcelain plate.								
	Diameter, mm.....	50	65	80	100	125	150	200	
	Each.....	.55	.70	.85	1.00	1.35	1.70	2.05	
28620.	Funnels, Royal Berlin Porcelain, Buchner, with fixed, perforated plate. While more expensive, this funnel is distinctly superior to No. 28616 in that funnels of the same size have an equal number of perforations of 1 mm diameter in the plate.								
	Diameter of funnel, mm.....	50	85	112	160				
	Each.....	.90	1.50	2.10	4.20				
28624.	Funnels, Royal Berlin Porcelain, Hirsch, with fixed, perforated porcelain plate.								
	Diameter of funnel, mm.....	50	75	92	103	120	140	163	
	Diameter of plate, mm.....	36	44	57	59	59	59	112	
	Diameter of holes, mm.....	1	1	1	1½	1½	1½	1½	
	Each.....	.60	.75	.90	1.20	1.50	2.10	2.70	
28628.	Funnels, Hard Rubber, with corrugated spout which allows the air to escape so that the liquid flows freely.								
	Capacity.....	½ pt.	½ pt.	1 pt.	1 qt.				
	Each.....	.35	.45	.60	.75				



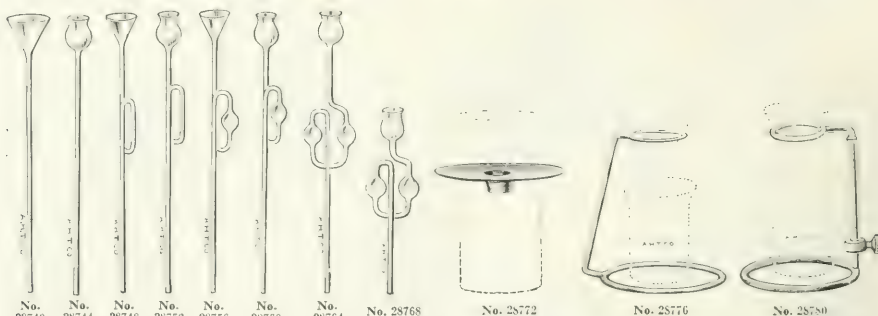


28632. **Funnel, Hot Water**, of heavy, polished copper, double wall, on three iron legs. Much superior to the ordinary article made without inside wall of copper. Including a glass funnel No. 28544, 150 mm diameter. 6.00
28636. **Funnel, Hot Water**, double walled, with constant water level, Bunsen ring burner, clamp, stopcock and glass funnel, 150 mm diameter, but without support. 7.50
28640. **Funnel, Hot Water**, same as No. 28636, but with support. 8.15
28644. " " for electric heating, particularly recommended for filtration of culture media. Of copper, with constant water level and stand and connection cord and plug for electric light socket. Voltage must be stated in ordering. Including a glass funnel, 150 mm diameter. 16.00
28648. **Funnel, Hot Air, Lothar Meyer**, of copper, double walled. With ring burner, support and a funnel, 120 mm diameter. 10.00

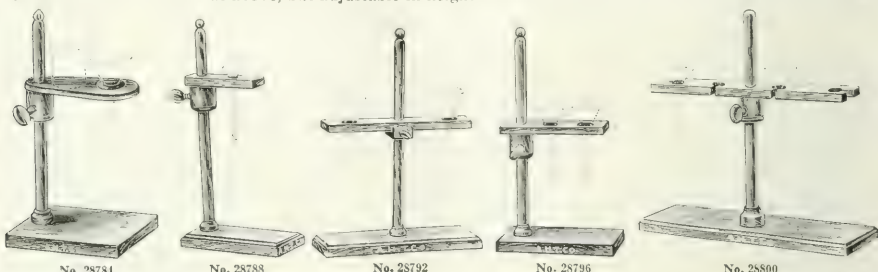


28652. **Funnel, Hot Water**, of tin, with double wall. 2.50
28656. " " same as No. 28652 but of copper throughout. 4.50
28660. **Funnel, Hot Water or Steam**, consisting of a lead coil and one glass funnel, 170 mm diameter. 4.50
28664. **Funnels, Separatory**, of heavy glass, with glass stopper.
- |                   |      |      |      |      |      |
|-------------------|------|------|------|------|------|
| Capacity, cc..... | 250  | 500  | 1000 | 2000 | 4000 |
| Each.....         | 2.00 | 2.25 | 2.50 | 3.00 | 4.00 |
28668. **Funnels, Separatory**, of heavy glass, with angle 60° and stem ground to point.
- |                   |      |      |      |      |      |
|-------------------|------|------|------|------|------|
| Diameter, mm..... | 100  | 150  | 180  | 200  | 240  |
| Each.....         | 1.50 | 2.25 | 2.50 | 3.00 | 3.75 |
28672. **Funnel Separatory, (Terrapin Separator)**, as used in the U. S. Department of Agriculture, Bureau of Chemistry, for the handling of emiscible liquids which separate with difficulty because of their tendency to form emulsions; 200 cc capacity, with ground in stopper and stopcock. 3.00

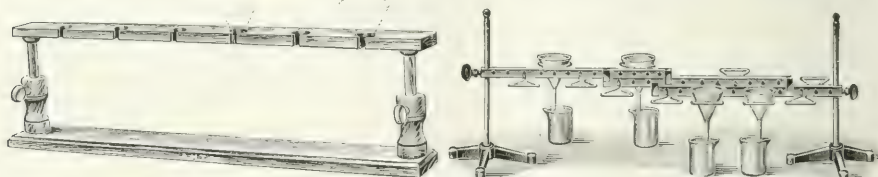




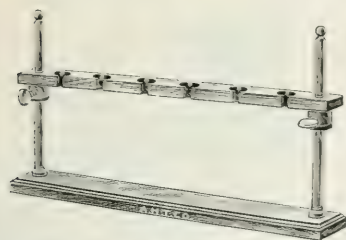
No. 28740	No. 28741	No. 28748	No. 28752	No. 28756	No. 28760	No. 28764	No. 28768	No. 28772	No. 28776	No. 28780		
28740.	Funnel Tubes, straight, with conical top. Length, mm.....								200	250	300	400
	Each.....								.10	.10	.12	.14
28744.	Funnel Tubes, straight, with thistle top. Length, mm.....								200	250	300	400
	Each.....								.07	.08	.10	.12
28748.	Funnel Tubes, with loop and conical top. Length, mm.....								200	200	300	400
	Each.....								.16	.20	.25	
28752.	Funnel Tubes, with loop and thistle top. Length, mm.....								200	300	400	
	Each.....								.15	.16	.20	
28756.	Funnel Tube, with loop, one bulb and conical top. Length 300 mm.....											.25
28760.	“ “ same as No. 28756 but with thistle top.....											.25
28764.	“ “ with double loop and one bulb on each side. With thistle top; length 300 mm.....											.25
28768.	“ “ same as No. 28764 but with bulbs near top and with short stem.....											.25
28772.	Funnel Support, for holding funnels on beaker. Diameter, mm... 65 80 100 120											
	Each.....								.20	.25	.35	.40
28776.	Funnel Support, Ostwald, of brass wire, for one funnel.....											.30
28780.	“ “ as above, but adjustable in height from 15 to 24 cm.....											1.00



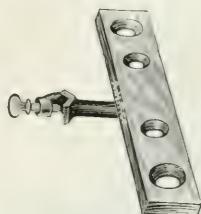
No. 28781	No. 28788	No. 28792	No. 28796	No. 28800
28781.	Funnel Support,	of wood, for one funnel.....		.90
28788.	" " "	" " " " " " " " .....		.50
28792.	" " "	" " " two funnels, one on each side..		.75
28796.	" " "	" " " both on one side.....		.70
28800.	" " "	" " " four funnels, two on each side.....		.90



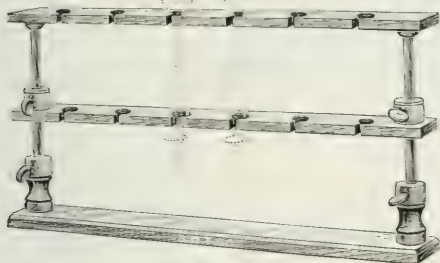
No. 28804		No. 28808	
28804.	Funnel Support, of wood, improved pattern. For funnels.....	6	12
	Each.....	2.75	4.50
28808.	" Support, Schultz, of brass, nickel plated, adjustable in length from 40 cm to 120 cm and adaptable to from 1 to 20 simultaneous filtrations; with 12 triangular funnel supports.....		15.00



No. 28812



No. 28824

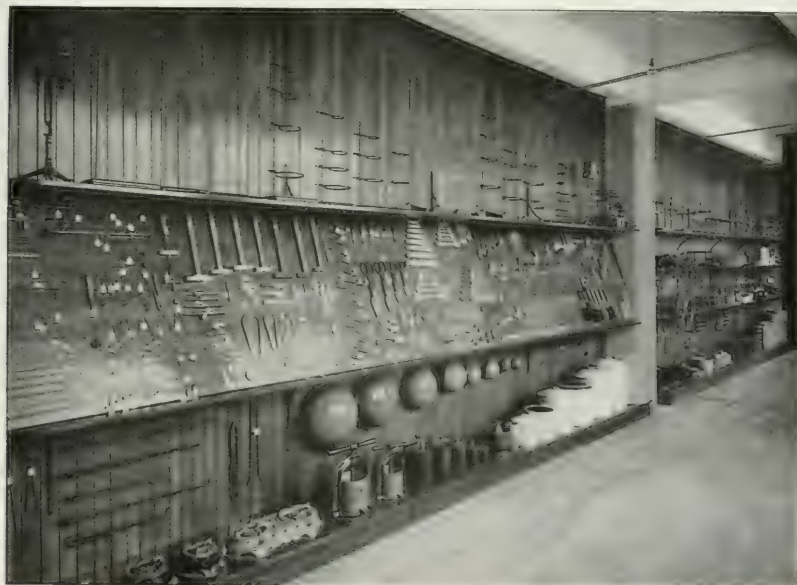


No. 28820



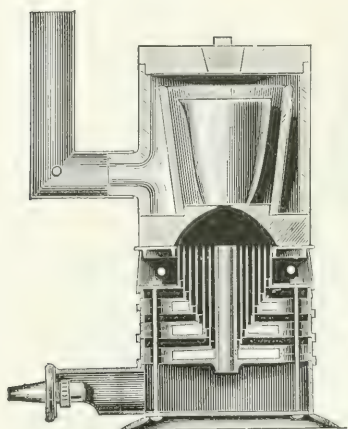
No. 28828

28812.	Funnel Support, of wood for six funnels in one row, with slotted holes.....	2.00
28816.	" " " " " " twelve funnels, six in each row, with slotted holes .....	4.50
28820.	Funnel Support, Leach, for separatory funnels, .....	6.00
28824.	" " " " for four funnels, of wood with metal clamp, for attaching to support .....	.50
28828.	Funnel Support, revolving form, a very convenient new model.....	25.00

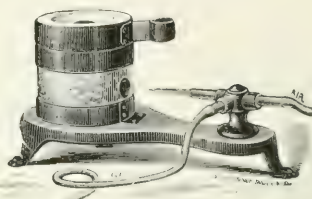


View in Salesroom Showing Arrangement of Samples

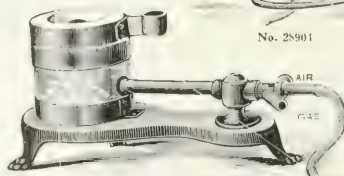




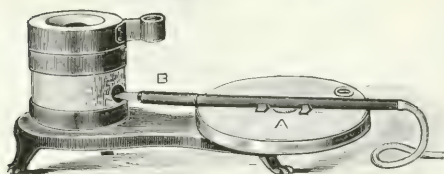
No. 28900



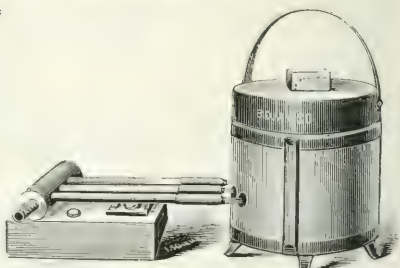
No. 28901



No. 28908



No. 28912

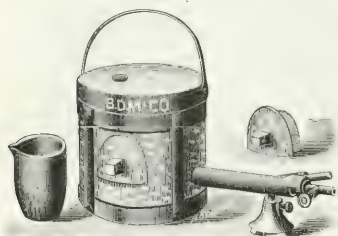


No. 28916

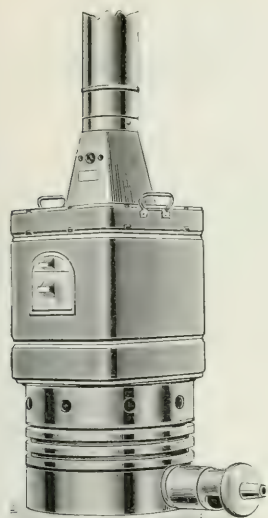
28900. Furnace, Fletcher Crucible No. 15, for operation without blast. Takes crucibles up to  $4 \times 3\frac{1}{2}$  inches. For operation with either illuminating gas, natural gas or gasoline gas. Requires  $\frac{1}{2}$  inch diameter gas feed pipe. Price includes 6 ft. of pipe, a No. 3 clay crucible, clay cylinder and tongs 16.00
28904. Furnace, Fletcher Crucible No. 40, for illuminating gas only. Requires blast from foot blower such as No. 21968 and  $\frac{1}{2}$  inch gas supply pipe. Takes No. 00 clay crucible. Complete with one No. 00 crucible, but without foot blower. 3.50
28908. Furnace, Fletcher Crucible No. 40a, Injector. For use with illuminating gas, natural gas or gasoline gas. Requires  $\frac{1}{2}$  inch supply pipe and takes a No. 00 clay crucible. May be used with foot blower No. 21968 and, where regular gas supply is not available, with gasoline gas generator. Complete with one No. 00 clay crucible, but without foot blower. 4.00
28912. Furnace, Fletcher Crucible Kerosene Blast No. 40B, for use with refined petroleum or kerosene oil. Requires foot blower No. 21968 and takes No. 00 clay crucible. Complete with one No. 00 clay crucible but without foot blower. 5.50
28916. Furnace, Fletcher Crucible Kerosene Blast No. 41E, similar to No. 28912 but larger. Complete with one No. 1 clay crucible and two burners, but without foot blower. 10.50
28920. Furnace, Fletcher Crucible Kerosene Blast, similar to No. 28916 but larger. Complete with one No. 3 clay crucible and three burners, but without foot blower. 13.00

#### 28924. Furnace, Fletcher Combined Muffle and Crucible No.

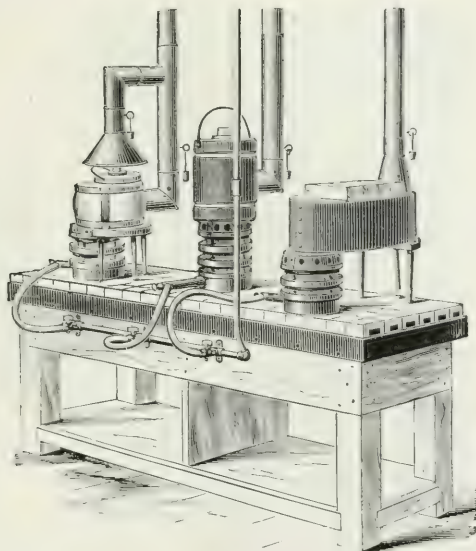
141, for use with illuminating gas, natural gas or gasoline gas. Requires foot blower No. 21968 and 1 inch bore supply pipe. Takes a No. 3 crucible or a muffle  $3\frac{1}{2} \times 2\frac{1}{4} \times 6\frac{1}{4}$  inches, or, when used as a crucible furnace only, takes a No. 6 crucible. Complete with muffle and one No. 3 clay crucible, but without foot blower. 11.00



No. 28924

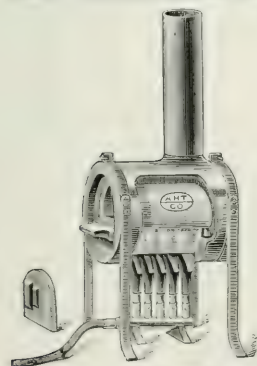


No. 28928



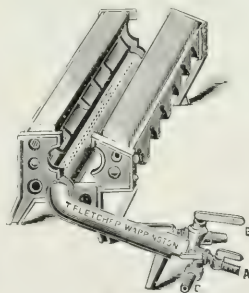
No. 28936-40

28928. **Furnace, Fletcher Muffle**, for exact temperatures not exceeding that of the fusing point of copper. For use with illuminating gas, natural gas or gasoline gas. Complete with muffle, dome, crucible tongs and 6 ft. of pipe.
- | Number                       | 3  | 4  | 5  | 6   |
|------------------------------|--|--|--|---|
| Muffle space, inches         | $5\frac{1}{4} \times 5\frac{3}{4} \times 5\frac{1}{2}$ | $7\frac{1}{2} \times 6\frac{1}{4} \times 5\frac{3}{4}$ | $8\frac{1}{4} \times 7\frac{1}{4} \times 6\frac{1}{2}$ | $10\frac{1}{4} \times 9\frac{1}{4} \times 8\frac{1}{4}$ |
| Bore of gas pipe, inches     | $\frac{3}{8}$  | $\frac{3}{4}$  | 1  | 1   |
| Each                         | 17.00  | 22.00  | 35.00  | 45.00   |
| Extra Domes or Muffles, each | 1.00   | 1.25   | 1.50   | 2.50  |
28932. **Furnace, Assayer's Combination, Brown**, fully described in "Manual of Assaying Gold, Silver, Copper and Lead Ores." For use with illuminating gas, natural gas or gasoline gas. Consists of three furnaces; the one on the left for roasting sulphurets, the center one for crucible fusions, taking a plumbago crucible 4 inches high by  $3\frac{3}{4}$  inches in diameter, and the one on the right for scorification and cupellation. Complete with plumbago fittings, chimney pipe, horizontal gas pipe and three  $\frac{3}{8}$  inch taps, as illustrated, but without vertical gas pipe, fire-brick covered bench or rubber tubing.
28940. **Fire-Brick Covered Bench, extra**..... 57.00  
32.00



No. 28944

28944. **Furnace, Wiesnegg Muffle, original French make**, for incineration. As supplied by us to the Food Laboratories of the U. S. Department of Agriculture, etc. Muffle dimensions 115 x 70 x 165 mm. Complete with muffle and 6 gas burners..... 16.00
28948. **Extra Muffles, each**..... .75
28952. **Combustion Furnace, Fletcher**, for ordinary gasoline or natural gas. For high temperatures it should be used with Foot Blower No. 21952 or other form of blast.
- Length of furnace, inches  
12 18 24
- Each. 12.00 16.00 20.00
28956. **Extra Fire-Clay Tiles**, 6 inches long, for use with Furnace No. 28952. Each..... .50

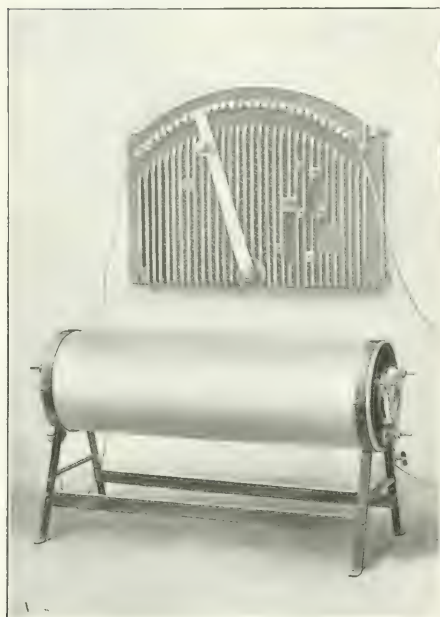


No. 28952

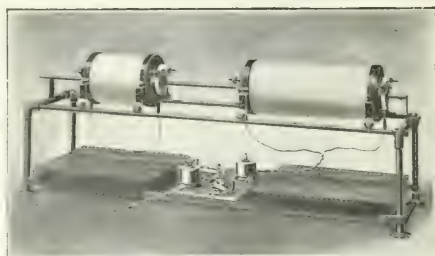




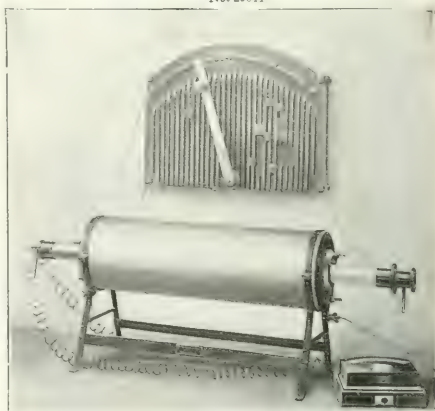




No. 29033



No. 29041



No. 29041

**Combustion Furnace, Heraeus, Type A.** Wound with platinum ribbon for a maximum temperature of 1400° C. The inside diameter of the tube is 20 mm. Voltage must be specified in ordering. Prices include platinum. Length of heating tube, cm.....

29032.	Furnace only, without rheostat.....	47.50	63.00	72.50
29033.	“ with rheostat for 110 volts.....	61.50	85.00	98.10
29034.	“ “ “ 220 “.....		85.00	98.10

**Combustion Furnace, Heraeus, Type B,** exactly same as No. 29032 but with tube 30 mm inside diameter and maximum temperature of 1350° C. Length of heating tube, cm..

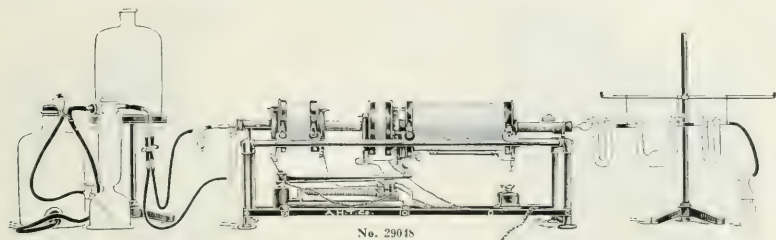
29036.	Furnace only, without rheostat.....	57.00	69.00	78.50	90.50
29037.	“ with rheostat for 110 volts.....	72.00	91.00	104.10	124.50
29038.	“ “ “ 220 “.....		91.00	104.10	124.50

**Combustion Furnace, Heraeus, for Reactions in Vacuum or in Gases other than Air.** This is a platinum wound furnace of the same type as No. 29032 and No. 29036 but with larger internal chamber so that a special tube with closed end may be inserted. One end of the tube is provided with connections for the thermo-couple of a pyrometer and the other end with a mica observation window and inlet and outlet tubes for the gases. Tubes can be used of Royal Berlin porcelain, glazed inside and outside, opaque fused silica or Marquardt mass. For temperatures under 1000° C. the Royal Berlin glazed porcelain tubes are recommended as being more likely to be entirely gas tight. We guarantee none of the tubes to be absolutely gas tight under all conditions. With silica or Marquardt tubes a temperature of 1300° C. can be obtained. Prices include a suitable tube of Royal Berlin porcelain with the end fittings as shown in illustration but do not include pyrometer or thermo-couple. Inside diameter of the tube is 1 1/8 inches.

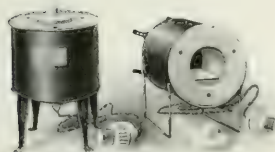
	Length of heating surface, cm.....	30	60
29040.	Furnace, without rheostat.....	93.25	142.50
29041.	“ with 110 volt rheostat.....	127.25	185.00
29042.	“ “ 220 “.....	127.25	185.00

**Combustion Furnace, Heraeus, for Organic Analysis.** Consists of two mutually independent furnaces mounted on wheels which operate on top of a supporting frame. A grooved metal trough extends through both furnaces and carries a combustion tube which should be about 90 cm in length. Each furnace is provided with a separate rheostat. The larger furnace is 35 cm in length and will cover a charge of copper oxide about 25 cm long. Prices include platinum.

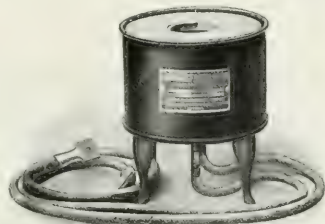
	Voltage.....	110	220
29044.	Each.....	135.00	124.50



29048. Combustion Furnace, Heraeus-Dennstedt, for elementary organic analysis. See *Zeitschrift für angewandte Chemie* 1905, 18, 1134. For 110 volts the furnace takes about 16 grams of platinum and the 220 volt takes about 8 grams. This is not included in the price and is added to the cost of the furnace at market price. The glassware and supports constituting the train after Dennstedt are not included in the price nor is the combustion tube. Furnace only, for either 110 or 220 volts, Duty Free..... \$2.50
29052. Complete Set of Glass Parts, rubber connections and supports for above, outfit to be arranged as shown in illustration. Duty Free..... 27.00



No. 29056



No. 29060

**Furnace, Electric, Hoskins Crucible Type FA**, for operation between a minimum of 316° C and a maximum of 1000° C, for either 110 or 220 volts alternating or direct current. Life of the heating element of nickel chromium about 1000 hours if operating temperature is kept at maximum or below by means of rheostat which should always be used in connection with the furnace for safety as to burn outs and accurate control. Power consumption of No. 101 is 450 Watts and of No. 103 is 1000 Watts. Voltage must be specified in ordering.

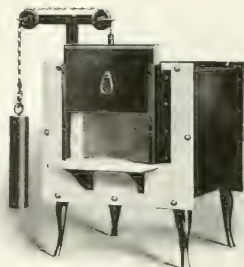
	Number.....	FA 101	FA 103	FA 104
	Internal dimensions of chamber, inches.....	2 x 2½	4 x 4	5 x 5
29056.	Furnace only.....	18.00	40.00	60.00
29057.	Furnace with rheostat.....	23.00	48.00	70.00
	Alundum Core only.....	1.00	2.00	4.00
	Heating Unit.....	1.00	2.00	3.00
	Core wound with wire.....	4.00	8.00	13.00
<b>Furnace, Electric, Hoskins Crucible Type FB</b> , for alternating current only, for operation at a maximum of 1100° C continuously with great economy of energy. They operate only on low voltages, i. e. 10 to 55, varying with the size of the Furnace and which is more satisfactorily obtained by stepping down by means of a special transformer. Voltage and number of cycles must be specified in ordering.				
	Number.....	FB 101	FB 102	FB 105
	Inside dimensions of chamber, inches.....	1½ x 1½	2 x 2½	4 x 6
29060.	Furnace only.....	18.00	20.00	60.00
29061.	Furnace with Rheostat and Transformer, 60 cycles.....	41.00	45.00	109.00
29062.	Furnace with Rheostat and Transformer, 25 cycles.....	51.00	55.00	122.50
	Extra Heating Units.....	3.00	4.00	8.00

#### Note Regarding Use of Hoskins Type FA Furnaces

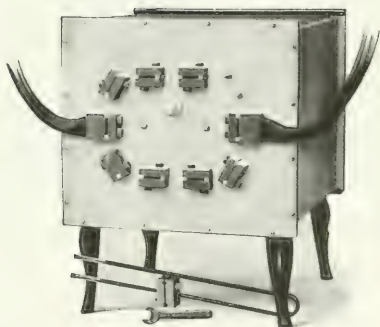
All Hoskins Type FA Furnaces are wound so that when connected to the proper voltage (110 or 220 volts alternating or direct) which is always stamped on the name plate, they will reach the maximum safe working temperature of 1832° F or 1000° C in approximately one hour. The Type FA Tube and Crucible Furnaces require approximately 40 minutes to reach this temperature. If these furnaces are left on the full line voltage after they have reached 1832° F the temperature will continue to increase and the resistance element will consequently burn out in a short time. To guard against this, a rheostat should always be connected in series with the furnace, and after the furnace has reached the desired working temperature the rheostat handle should be turned back part of the way toward the starting position. The proper point at which to set the rheostat handle in order to maintain any desired temperature may readily be determined by trial. Where the furnace is frequently operated at the same temperature it is convenient to make a mark on the rheostat at the proper point for maintaining this temperature, and after furnace has reached the proper temperature the rheostat handle can be set at the mark and left there, thus insuring that the proper temperature will not be exceeded.



No. 29064



No. 29065



No. 29068—Rear View of Type FB202



No. 29068—FB206

Furnace, Electric, Hoskins Muffle Type FA, general specifications the same as above with the exception of shape. FA 201 consumes 1100 Watts and FA 204 consumes 4150 Watts. Voltage must be specified in ordering.

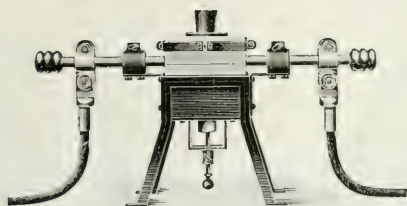
		FA 201	FA 202	FA 203	FA 204
	Number.....	50.00	50.00	65.00	80.00
	Inside dimensions of chamber, inches... $3\frac{1}{2} \times 2\frac{1}{2} \times 5$	$4\frac{1}{2} \times 3 \times 8$	$5\frac{1}{2} \times 3\frac{1}{2} \times 9$	$7\frac{1}{2} \times 5\frac{1}{2} \times 11$	
29064.	Furnace only.....	43.00	60.00	85.00	110.00
29065.	Furnace with rheostat.....	2.50	4.00	5.00	7.00
	Alundum Muffle only.....	2.50	4.00	6.00	10.50
	Heating Unit.....	9.00	13.50	18.00	28.00
	Muffle wound with wire.....				

Furnace, Electric, Hoskins Muffle Type FB, operating within the same limits as Type FB Crucible Furnaces above. The control on the small size FB 202 is by means of rheostat with transformer but in all of the larger sizes is accomplished by means of regulating transformer only. Furnaces FB 206 and FB 207 are furnished on wire stand as shown in illustration.

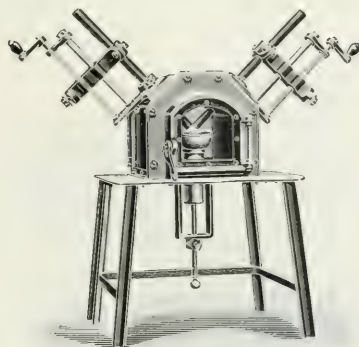
		FB 202	FB 204	FB 206	FB 207
	Number.....	$4\frac{1}{2} \times 3 \times 9$	$7\frac{1}{2} \times 5 \times 12\frac{1}{2}$	$12 \times 8 \times 19$	$12 \times 8 \times 26$
	Inside dimensions of chamber, inches... 10	10	14	14	
	Number of Heating Units.....	60.00	95.00	250.00	300.00
29068.	Furnace only.....	116.00	190.00	422.00	486.00
29069.	Furnace with Rheostat and Transformer, 60 cycles.....	132.50	210.00	481.00	554.00
29070.	Furnace with Rheostat and Transformer, 25 cycles.....	1.00	2.00	3.00	4.00
	Heating Units, each.....				

#### Note Regarding Use of Hoskins Type FB Furnaces

Hoskins Type FB Furnaces which are operated in connection with rheostat control, i. e., Type FB 101, 102, 105, 202 and 301 are controlled in the same manner as Type FA Furnaces, the use of the transformer with the above mentioned Type FB Furnaces being simply for the purpose of stepping down the line voltage to the proper pressure for these furnaces.



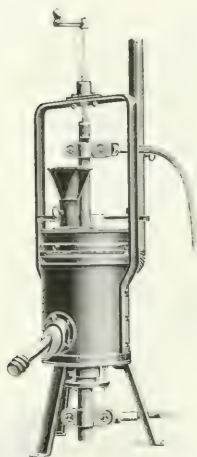
No. 29072



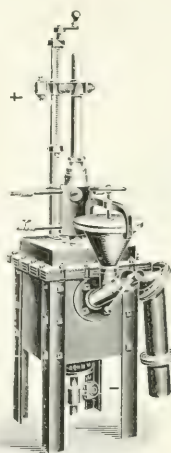
Nos. 29076 and 29080

29072. Furnace, Electric Arc, Moissan Type, new model for experimental work. Current consumption 100 amperes at 50-60 volts. Accommodates a crucible 50 mm high by 45 mm diameter or a dish 35 mm high by 28 mm diameter. Without cables.			
Duty Free.....	49.50	Duty Paid.....	65.00
Accessories			
1 pair Cables, 150 cm long, with connections.....		Duty Free	Duty Paid
Extra per meter per pair when cables longer than above are required		11.40	15.00
Carbon Electrodes, 350 x 22 mm, per pair.....		2.85	3.75
Carbon Crucible with depression for electrodes.....		.45	.60
Magnesite Crucible.....		.27	.35
Magnesite Dish.....		.30	.40
Carbon Dish.....		.60	.80
Magnesite Dish.....		.27	.35
Magnesite Dish.....		.27	.35
Magnesite Dish.....		.60	.75
Note—Duty Free prices are extended on Accessories only when they are ordered in connection with the Furnace and complete outfit.			
29076. Furnace, Electric Arc, Moissan Type, new model with carbon adjustment. Current consumption 100 amperes at 50-60 volts. Will accommodate a dish 100 mm in diameter by 55 mm high. Without cables.			
Duty Free.....	87.40	Duty Paid.....	115.00
Accessories			
1 pair of Cables, 150 cm long, with connections.....		Duty Free	Duty Paid
Extra per meter per pair when cables longer than above are required		11.40	15.00
Screen of colored glass.....		2.85	3.75
Carbon Dish, 100 mm diameter.....		4.50	6.00
Magnesite Dish, " " ".....		.35	.45
Magnesite Dish, " " ".....		.45	.60
Magnesite Dish, " " ".....		.95	1.25
Carbon Electrodes, 500 x 22 mm, per pair.....		.60	.75
29080. Furnace, Electric Arc, same as No. 29076 but with a current consumption of 200 amperes at 50-60 volts. Without cables.			
Duty Free.....	136.80	Duty Paid.....	180.00
Accessories			
1 pair of Cables, 150 cm long, with connections.....		Duty Free	Duty Paid
Extra per meter per pair, when cables longer than above are required.		19.75	26.00
Screen of colored glass.....		9.50	12.50
Carbon Dish, 100 mm diameter.....		4.50	6.00
Magnesite Dish " " ".....		.35	.45
Magnesite Dish " " ".....		.45	.60
Magnesite Dish " " ".....		.95	1.25
Carbon Electrodes, 500 x 40 mm, per pair.....		1.60	2.00
29084. Furnace, Electric Arc, for Continuous Operation, for the handling of oxides difficult to reduce, such as chrome oxide, etc., as well as more or less infusible metals. The oven may be filled through the funnel at the top and emptied through the spout at the side. Dimensions of melting chamber 140 x 100 mm. For current consumption of 100 to 150 amperes at 50-60 volts.			
Duty Free.....	95.00	Duty Paid.....	125.00
Accessories			
1 pair of Cables, 150 cm long, with connections.....		Duty Free	Duty Paid
Extra per meter per pair when cables longer than above are required..		16.00	21.00
Colored Glasses with one pair of extra glass discs.....		4.50	6.00
Crucible of Carbon, with outlet tube.....		1.35	1.75
" " Magnesite, with outlet tube.....		3.80	5.00
Upper Carbon Electrodes, 500 x 30 mm.....		4.50	6.00
Lower " " 300 x 40 mm.....		.45	.60
		.60	.75

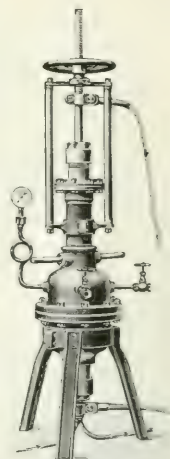




No. 29081



No. 29088



No. 29092

29088. **Furnace, Electric Arc**, for distillations of phosphorus and various metals. The distillate is taken off through the side tube and the remaining material after the removal of the lid. For current consumption of 100 to 150 amperes at 50-60 volts. Dimensions of melting space 140 x 100 mm. Without cables.

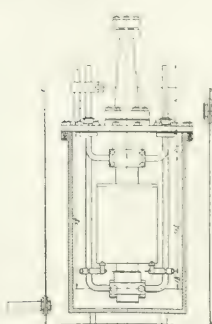
Duty Free.....	171.00	Duty Paid.....	225.00
Accessories			

1 pair of cables, 150 cm long, with connections.....	16.00	Duty Paid	21.00
Extra per meter per pair, when cables longer than above are required.....	4.50		6.00
Crucible of Carbon.....	3.80		5.00
"    Magnesite.....	4.50		6.00
Upper Carbon Electrodes, 750 x 30 mm, per pair.....	.55		.70
Lower    "    300 x 40 mm, per pair.....	.60		.75

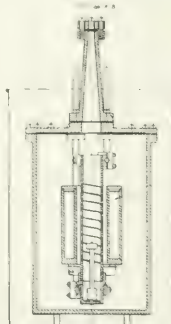
29092. **Furnace, Electric Arc, Vacuum or Pressure**, or for operation with gases other than air. Current consumption 100 to 150 amperes at 50-60 volts. Without cables.

Duty Free.....	285.00	Duty Paid.....	375.00
Accessories			

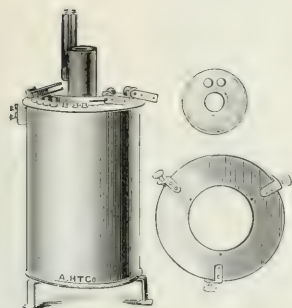
1 pair of Cables, 150 cm long, with connections.....	16.00	Duty Free	Duty Paid
Extra per meter per pair, when cables longer than above are required.....	4.50		6.00
Carbon Crucible, 70 x 60 mm.....	.35		.45
Carbon Electrodes, 450 x 25 mm. each.....	.40		.55



No. 29096

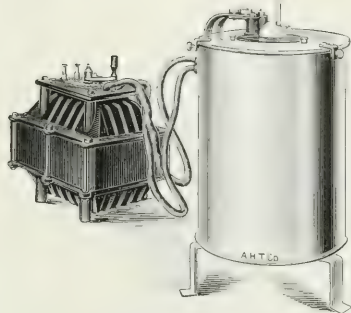


29096. **Furnace, Arsem Electric Vacuum**, as used in the Research Laboratories of the General Electric Company, U. S. Bureau of Standards, etc. Sizes and descriptions of various installations on request.



No. 29100

Large Furnace with Top and Cover removed  
and Heater Unit disconnected

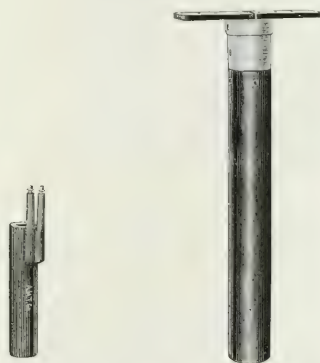


No. 29100

Large Furnace, Assembled and Connected with  
Special Transformer



Cascade Attachment for Large Furnace taken apart



Heater Unit of Large Furnace Cascade Attachment Assembled

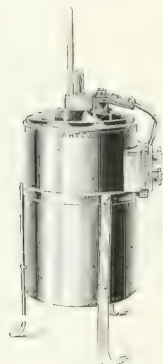
**FURNACES, HIGH TEMPERATURE ELECTRIC, NORTHROP**, a new construction of electric furnace on a non-vacuum principle wherein the furnace itself develops in its heating chamber an atmosphere of carbon monoxide. The furnaces consist essentially of three main parts, a graphite heater unit, an inner compartment of moulded refractory material into which the heater unit fits, and an outer compartment filled with powdered refractory material, with outside jacket of polished monel metal. The furnaces are of the vertical type and heating chamber in the large model is a tube  $1\frac{1}{2}$  inches internal diameter and 12 inches long, and in the small model 1 inch in diameter and  $5\frac{1}{4}$  inches long. The Cascade Attachment for the large model is inserted in the chamber of the large furnace after same has been brought to a high temperature and the energy from the same transformer transferred by means of switch to the heating element of the attachment. The resistor-unit of the Cascade Attachment consists of a tube of re-graphitized Acheson graphite containing a crucible 11 mm internal diameter and 70 mm deep. These furnaces operate only on alternating current of low voltage.

**Transformer for Large Model**—This is specially made for a primary of 110, 220, 220 or 240 volts with five taps offs on its winding and a switch whereby the secondary voltage may be regulated as many steps for a variety of temperatures. Capacity 4 K. W. for continuous operation and available for short intervals at a greater load.

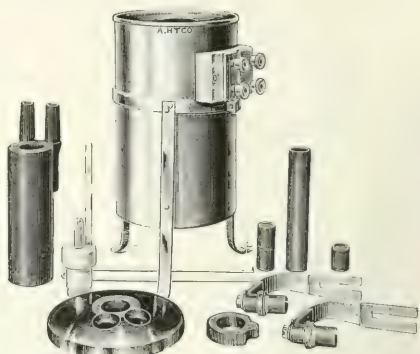
**Transformer for Small Model**—Capacity 1.5 K. W. continuously or 3 K. W. for 30 minutes.

**Temperatures**—For the large model a working temperature of over  $1600^{\circ}\text{C}$ . is not recommended although an occasional use at the temperature of melting platinum,  $1755^{\circ}\text{C}$ . is possible. With the Cascade Attachment in the large model a temperature of over  $3000^{\circ}\text{C}$ . is attained throughout a heating space of 15 cc. The small model may be safely operated at temperatures up to  $1800^{\circ}\text{C}$ .

**Use**—These furnaces have been developed by Dr. Northrup for use in his own researches upon the electrical conduction of matter at high temperatures but they have a great variety of application between  $1100^{\circ}\text{C}$ . and  $1800^{\circ}\text{C}$ ., avoiding the inconvenience and expense of the vacuum type furnace and where the temperature required makes the use of platinum wound furnaces impossible. No contaminating vapors are given off in these furnaces and their perfect black body temperature makes them admirable for the calibration of optical pyrometers. The small furnace is particularly adapted for melting cylinders or cones of coal ash without the gradual deterioration of the heater unit by vapors given off by the material. The furnaces are well adapted to the fusing of any of the precious metals and to the study of alloys because of the freedom from contamination during the process.



No. 29116  
Small Furnace, Assembled



No. 29116  
Small Furnace Showing All Principal Parts

29100. Furnace, Northrup, High Temperature Electric, Large Model, including graphite-crucible-tube with tongs for convenient handling and one cover piece for Furnace. Without transformer.. 360.00
29104. Special Transformer for Large Model, 4 K.W. capacity for continuous operation. To work on primary line of 110, 120, 220 or 240 volts, as ordered. The secondary voltage is regulated in five steps by tap offs from the primary winding..... 165.00
29108. Cascade Attachment for Large Model, with double-pole double throw switch with two pairs of flexible leads with connectors..... 125.00
29116. Heater Units for Large Model, of standard size and construction and ready for quick connection.. 35.00
29120. Graphite-Crucible-Tube for Large Model, 12 $\frac{1}{2}$  inches long with  $\frac{3}{8}$  inch wall, closed at bottom..... 5.00
29124. Special Tongs, for handling graphite-crucible-tubes..... 1.50
29128. Cylindrical Graphite Weights for Large Model. These fit in the graphite-crucible-tube and are 2 inches high. They are convenient for use in building up load to bring the charge to any desired height from the bottom of the Furnace. Arranged for convenient handling by special tongs listed above..... 1.50
29132. Special Refractory Cylinders for Large Model. These are of the same shape and serve the same purpose as the Graphite Cylinders. They will not shrink or expand or contaminate the charge and have very high insulation..... 4.50
29136. Extra Covers for Large Model, of refractory material with window or sight hole and a stopper to close same when necessary..... 9.00
29140. Replaceable Resistor Units for Cascade Attachment..... 3.00
29144. Graphite-Crucible-Tubes for Cascade Attachment..... 1.50
29146. Furnace, Northrup, High Temperature Electric, Small Model, with one graphite-crucible-tube with tongs for handling, furnace cover piece and one compression carbon rheostat for insertion in the primary for close control of the voltage..... 90.00
29148. Special Transformer for Small Model, 1 $\frac{1}{2}$  K.W. capacity for continuous operation or 3 K.W. for 30 minutes. Primary winding to order for 110, 120, 220 or 240 volts. This transformer is not sold separately and is furnished only with the Small Model Furnace..... 65.00
29152. Heater Unit for Small Model, complete..... 30.00

#### References—

- "Resistivity of Copper in Temperature Range 20° C. to 1150° C." Journal of the Franklin Institute, January, 1914.
- "A New High Temperature Furnace." Metallurgical and Chemical Engineering, January, 1914.
- "High Temperature Resistivity of Refractories; a New Method of Measuring, with Results for Alundum." Metallurgical and Chemical Engineering, February, 1914.
- "Temperature and the Properties of Matter." Metallurgical and Chemical Engineering, June, 1912.
- "Molybdenum and Tungsten; Their Thermal E. M. F." Metallurgical and Chemical Engineering, January, 1913.
- "Resistivity of a few Metals Thru a Wide Range of Temperature." Journal of the Franklin Institute, February, 1913.
- "Some Effects of Temperature upon the Resistance of Graphite and Carbon." Metallurgical and Chemical Engineering, May, 1913.
- "Resistivity of Pure Gold in Temperature Range 20° C. to 1500° C." Journal of the Franklin Institute, March, 1914.
- "Resistivity of Brass: Solid and Molten." Metallurgical and Chemical Engineering, March, 1914.
- "Cascade Arrangement for Graphite Furnaces." Metallurgical and Chemical Engineering, May, 1914.

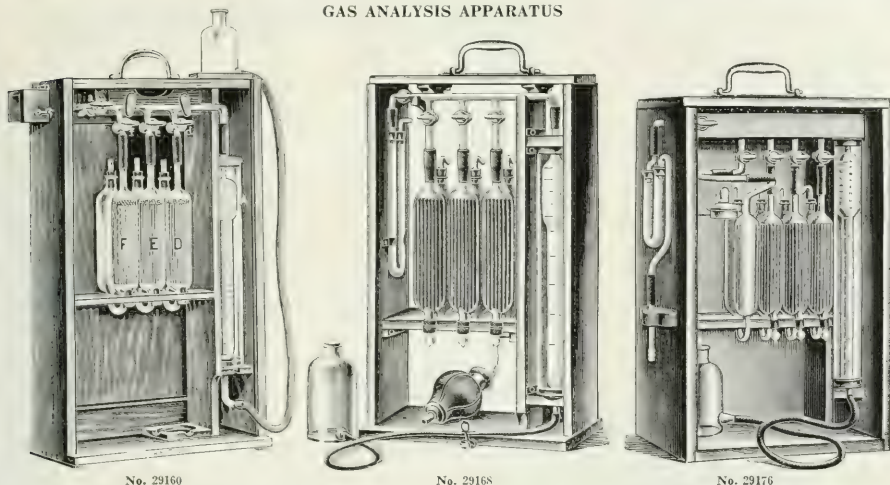
*Complete eight page circular, showing heating curves, etc., will be sent upon request.*



No. 29156

29156. **Fusel Oil Apparatus, Bromwell**, with stopcock and glass stopper in accordance with the requirements of the U. S. Department of Agriculture, Bureau of Chemistry, Bulletin 107, revised. . . . . 3.50

# GAS ANALYSIS APPARATUS



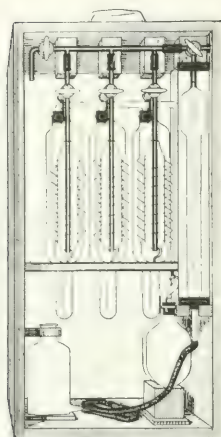
No. 29160

No. 29168

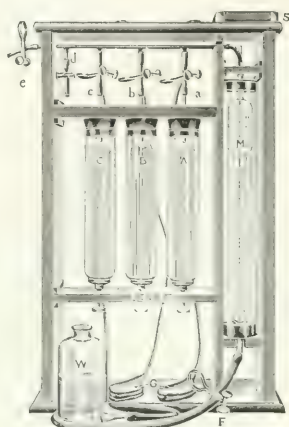
No. 29176

29160. **Gas Analysis Apparatus, Orsat-Muencke**, for the determination of  $\text{CO}_2$ ,  $\text{CO}$  and  $\text{O}$ , particularly in flue and furnace gases. Consisting of graduated measuring burette with water jacket, aspirator bottle, three absorption pipettes and manifold tube which projects through the upper left-hand side of the case and which is provided with four glass stopcocks. Complete in portable oak case of durable construction. . . . . 25.00
29161. **Manifold** for above with one horizontal and three vertical stopcocks, for three pipettes. . . . . 8.00
29168. **Gas Analysis Apparatus, Orsat-Fischer**. This apparatus differs from the Orsat-Muencke only in the addition of a drying tube inside the case and attached to the manifold, the left-hand end of which turns down to make this connection instead of projecting through the wooden case as in the Orsat-Muencke. For three pipettes. . . . . 25.00
29172. **Manifold** for above. . . . . 8.00
29176. **Gas Analysis Apparatus, Orsat-Lunge**, similar in arrangement and principle to the Orsat-Muencke, but with four pipettes and bent palladium tube with lamp for heating same for separate estimation of hydrogen, and also drying tube on outside of case. Complete in portable oak case. . . . . 34.00
29180. **Manifold** for above, with one horizontal stopcock and four pipette stopcocks. . . . . 10.00
- Note**—The pipettes, measuring burettes, etc., for the three preceding gas analysis apparatus are standard and interchangeable and are carried in stock separately as follows:—
29184. **Measuring Burette** only, without water jacket. . . . . 3.00
29188. **Water Jacket** only, for measuring burette. . . . . .75
29192. **Absorption Pipette**, plain. . . . . 2.00
29196. “ “ filled with glass tubes. . . . . 2.50
29200. “ “ “ “ “ and copper spiral. . . . . 2.50
29208. **Soft Rubber Bag** for attaching to pipette. . . . . .50
29212. **Rubber Bulb**, of black acid-cured rubber with double valve set in bone fittings. . . . . 2.50
29216. **Gas Analysis Apparatus, Orsat-Dennis**. See *Journal of Industrial and Engineering Chemistry*, Vol. 4, No. 12. Complete with measuring burette in water jacket, aspirator bottle, manifold tube with one horizontal stopcock and three pipette stopcocks and the new patent spiral absorption pipettes after Friedrichs. Complete in portable case. . . . . 45.00
29220. **Gas Analysis Apparatus, Orsat-Allen and Moyer**. See “*Transactions of the American Society of Mechanical Engineers*,” Vol. 18, p. 901, and “*Power Plant Testing*,” by J. A. Moyer, Chapter IX, 1911. The distinctive improvement over the preceding forms of Orsat Apparatus is in the substitution of hard rubber capillaries for glass and the new absorption pipettes which are easily removable for the renewing of solutions. . . . . 25.00

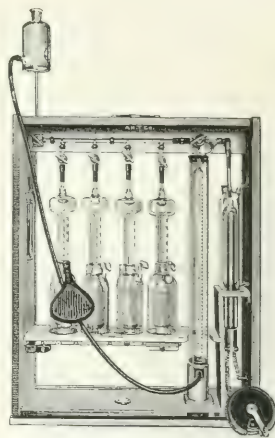




No. 29216

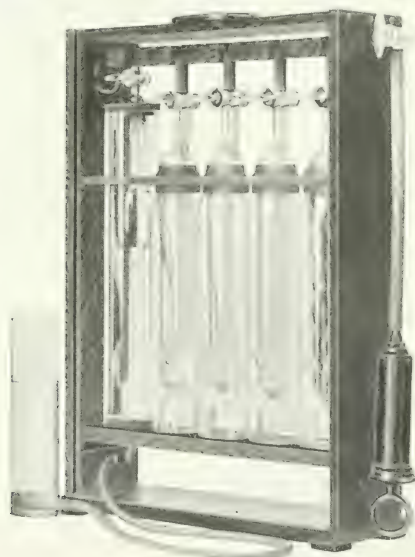


No. 29220

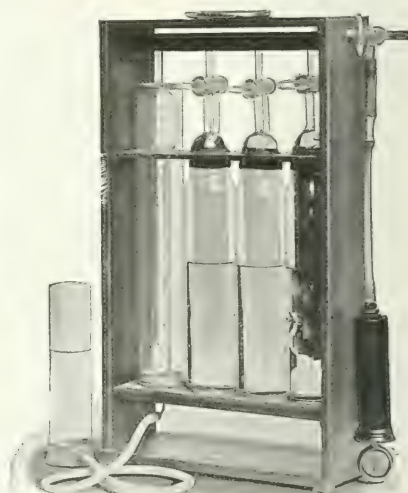


No. 29250

29280. Gas Analysis Apparatus, Lomschakow, for flue, generator and mine gases; a new system offering the advantage of great rapidity of operation, quick and complete absorption, economy of reagents and simple and convenient cleaning. See *Chemiker-Zeitung*, Nr. 123, 1913. With three absorption pipettes..... 50.00
29284. Extra Absorption Pipettes, each..... 10.00

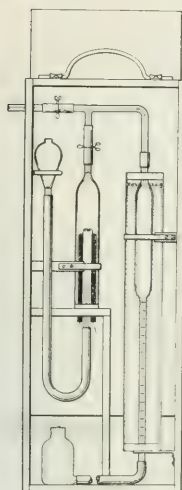


No. 29288

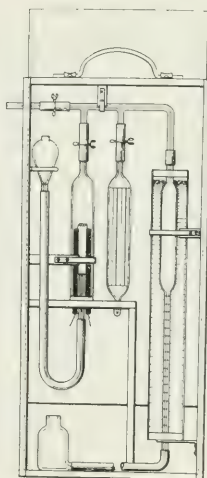


No. 29296

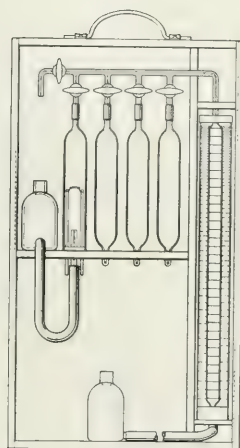
29288. Gas Analysis Apparatus, Williams Patent, Model A for complete analysis of combustible gases. For carbon dioxide, illuminants, oxygen, carbon monoxide, hydrogen, methane and nitrogen. Complete in portable oak case..... 50.00
29292. Portable Explosion Coil, with batteries, in quartered oak case..... 5.00
29296. Gas Analysis Apparatus, Williams Patent, Model B for flue gas analysis. With Williams' special bubbling pipettes. For carbon dioxide, oxygen and carbon monoxide..... 35.00



No. 29300



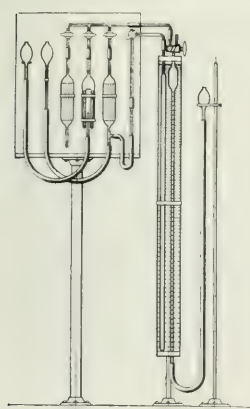
No. 29308



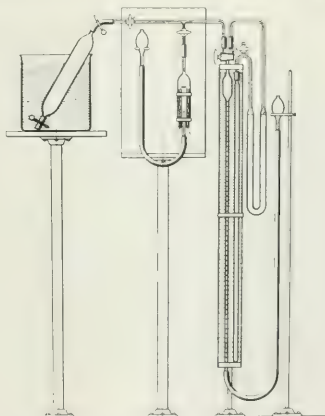
No. 29316

**GAS ANALYSIS APPARATUS, BURRELL, U. S. BUREAU OF MINES TYPE.** This series of Gas Analysis Apparatus is made in accordance with the original drawings furnished us by the Bureau of Mines and is in exact accordance with the specifications and descriptions in Bulletin 42 of the Bureau of Mines, *The Sampling and Examination of Mine Gases and Natural Gas*, Burrell and Seibert. The figure numbers given refer to illustrations in the above Bulletin. Prices on individual glass parts are quoted on application. All connections in explosion pipettes are of No. 27 platinum wire.

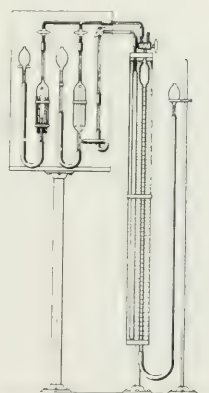
29300.	Apparatus for the Determination of Methane in Mine Air, Portable Form, Fig. 13 of Bulletin 42. Complete in wooden case with sliding doors, rubber tubing, clamps, etc.	17.00
29304.	Complete Set of Glass Parts only	8.00
29308.	Apparatus for the Determination of Carbon Dioxide and Methane in Mine Air, Portable Form, Fig. 14 of Bulletin 42. Complete with rubber tubing, clamps, etc., in wooden case with sliding doors.	18.50
29312.	Complete Set of Glass Parts only	9.00
29316.	Apparatus for the Approximate Analysis of Mine Air, Portable Form, Fig. 16 of Bulletin 42. Pipettes are filled with glass tubes not shown in illustration. Complete in wooden case with sliding doors	29.50
29320.	Complete Set of Glass Parts only	17.00



No. 29324



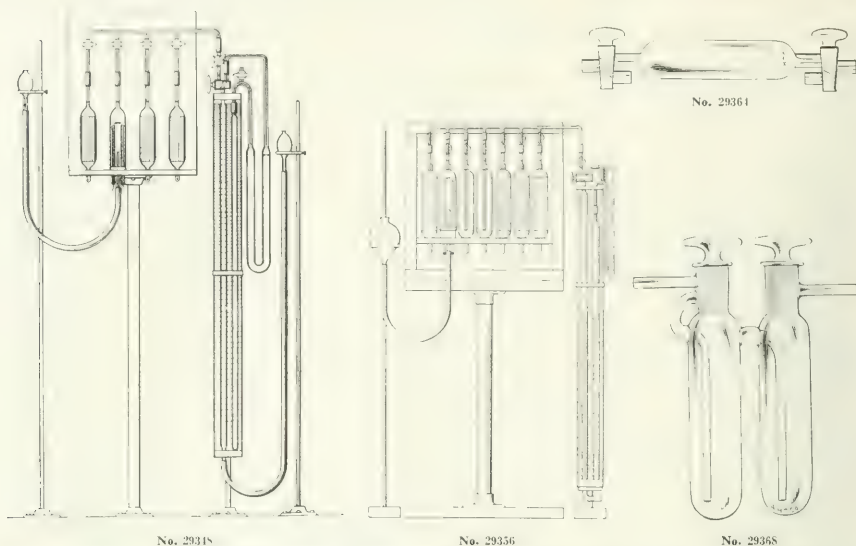
No. 29332



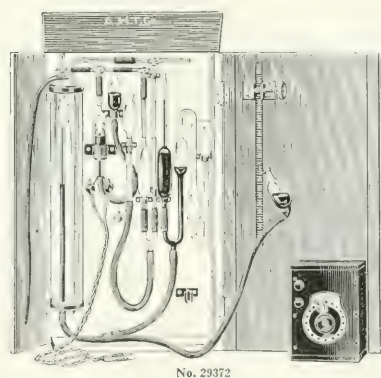
No. 29340

29324.	Apparatus for the Exact Analysis of Mine Air and Flue Gas, Laboratory Form, Fig. 7 of Bulletin 42. Complete with three iron supports, rubber tubing, etc.	35.50
29328.	Complete Set of Glass Parts only	21.50
29332.	Apparatus for the Exact Determination of Methane, Laboratory Form, Fig. 11 of Bulletin. Complete with supports, rubber tubing, clamps, etc.	34.50
29336.	Complete Set of Glass Parts only	20.00

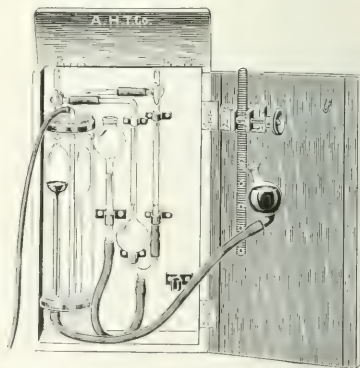
29340. Apparatus for the Exact Determination of Carbon Dioxide and Methane, Laboratory Form, Fig. 15 of Bulletin 42. Complete with iron supports, tubing, etc. .... 33.50  
 29344. Complete Set of Glass Parts only..... 19.50



29348. Apparatus for Natural Gas Analysis, Laboratory Form, Fig. 23 of Bulletin. Complete with four iron supports, rubber tubing, clamps, etc. .... 45.00  
 29352. Complete Set of Glass Parts only..... 25.50  
 29356. Apparatus for Mixtures containing  $\text{CO}_2$ ,  $\text{C}_2\text{H}_4$ ,  $\text{O}_2$ ,  $\text{CO}$ ,  $\text{H}_2$ ,  $\text{CH}_4$ ,  $\text{C}_2\text{H}_6$  and  $\text{N}_2$ , Laboratory Form, Fig. 17 of Bulletin 42. Complete with four iron supports, tubing, case, etc. .... 56.00  
 29360. Complete Set of Glass Parts only..... 35.00  
 29364. Gas Collecting Tube, Haldane, with three-way stopcock at each end, capacity 70 cc. .... 4.00  
 29368. Gas Absorption Tube, Blount, for moisture and carbon dioxide. See Haldane "Methods of Air Analysis" ..... 3.50

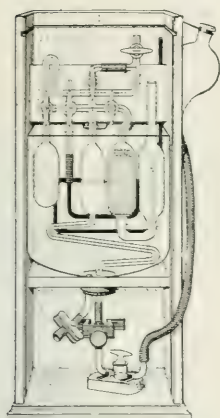


No. 29372

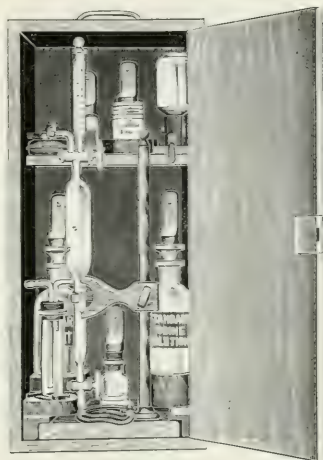


No. 29376

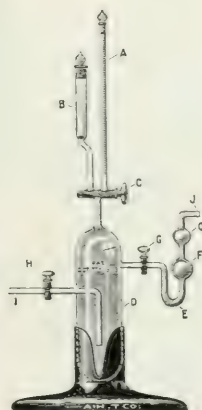
29372. Gas Analysis Apparatus, Haldane, Portable, for general air and gas analysis, especially designed for physiological investigations. See *Journal of Physiology*, Vol. 22, 1898 and Fig. 10, Haldane "Methods of Air Analysis," 1912. Complete in wooden case, with rheostat for controlling the current to the platinum spiral. .... 45.00  
 29376. Gas Analysis Apparatus, Haldane, for the determination of very small percentages of carbon dioxide in the physiological investigation of air in ordinary rooms, schools, factories, etc. See *Journal of Hygiene*, 1901, p. 103, First Report of the Departmental Committee on Factory Ventilation, 1902 and Fig. 11, Haldane "Methods of Air Analysis," 1912. Complete in wooden case... 32.00  
 Official English Certificate for above..... 10.00



No. 29388

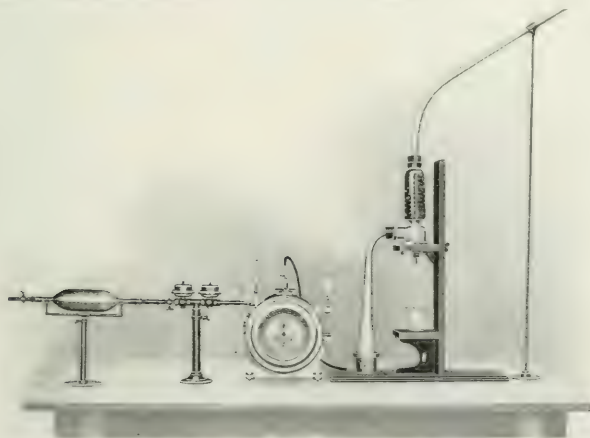


No. 29392

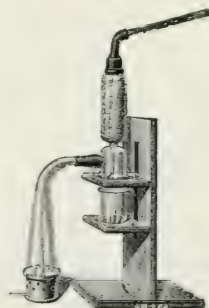


No. 29396

29388. Gas Analysis Apparatus, Petersen-Palmquist Anderson, for the convenient and exact determination of  $\text{CO}_2$  in air. The standard apparatus for investigations of ventilating and other sanitary conditions of schools, factories, etc. Complete in case. 50.00
29392. Sulphuretted Hydrogen and Ammonia Apparatus, Tutwiler, Standard U. G. I. Form. This apparatus gives direct readings in grains per 100 cu. ft. of gas of  $\text{H}_2\text{S}$  or  $\text{NH}_3$ . It affords a simple and accurate method for determining the efficiency of the condensing, scrubbing and purifying apparatus in gas manufacture. A determination may be made in less than three minutes. In portable case, with chemicals necessary for operation. 25.00
29396. Apparatus for Determining Hydrogen Sulphide in Gases, Johnson, Patented, a new system offering the advantage that accurate results may be obtained from small samples of gas as compared with the gravimetric method and that the time needed for a test is greatly shortened. 18.00
29397. Apparatus as above but in case with necessary reagents. 30.00



No. 29400

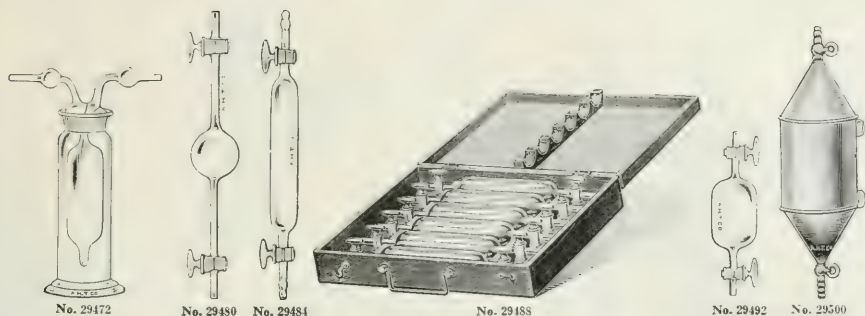


No. 29404

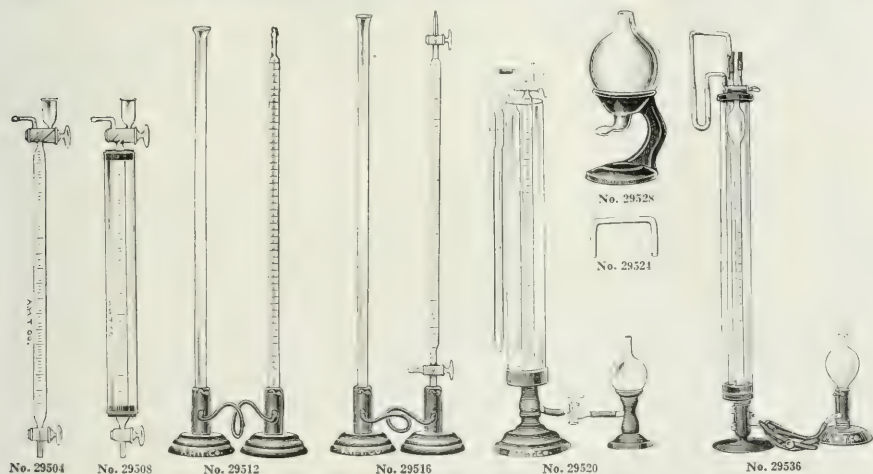
29400. Gas Apparatus for the Quantitative Determination of Sulphur and Ammonia, consisting of an ammonia saturator and automatic shut-off meter registering from  $\frac{1}{1000}$ th of a cu. ft. to 100 cu. ft. a double dry governor mounted on stand and a London Gas Referee's sulphur determination apparatus, mounted as illustrated. The apparatus conforms to the latest modifications of the Board of London Gas Referees. 115.00
29404. Sulphur Determination Apparatus, only, as used in above outfit, complete with burner and support. 15.00







29472.	Gas Washing Bottles, Muencke, with wide mouth. Capacity, cc.....	100	250	500
	Each.....	1.25	1.50	2.00
29480.	Gas Collecting Tube, with bulb in center and two glass stopcocks.....			2.50
29484.	“ “ long form, 125 cc capacity, with two stopcocks.....			2.50
29488.	Case for above, of polished mahogany, with fittings. To hold tubes.....		4	6
	Each.....		6.00	7.00
29492.	Gas Collecting Tube, short form, 125 cc capacity, with two stopcocks.....			2.50
29496.	Mailing Case, with screw cap, for convenient mailing of No. 29492 gas collecting tubes.....			.15
29500.	Gas Collecting Tube, Winkler, 12 inches long by $4\frac{1}{2}$ inches in diam.; of zinc with brass stopcocks....			3.00

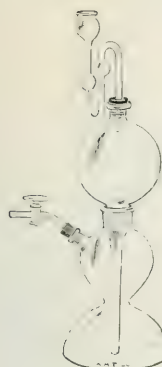


29504.	Gas Burette, Bunte, without water jacket. Graduated to 50 cc in $\frac{1}{10}$ ths, with two stopcocks..	5.00
29508.	“ “ “ same as No. 29504 but with water jacket.....	5.75
29512.	“ “ Hempel, on weighted wooden bases without stopcocks. Per set.....	5.00
29516.	Gas Burette, Hempel-Winkler, with glass stopcocks, on weighted wooden bases. Per set.....	7.50
29520.	Gas Burette, Hempel, with correction for temperature and pressure, for measurement of gas volumes varying between .5 and 100 cc. With stopcock and levelling bulb, complete as illustrated ..	12.50
29524.	Connecting Tube for gas burettes.....	.15
29528.	Levelling Bulb, on iron stand, convenient for use in gas analysis and other purposes.....	1.50
29532.	Glass Bulb only, for above.....	.75
29536.	Gas Burette, Standard U. G. I. Form, being Tutwiler's modification of Hempel's burette. With manometer, correction tube, water jacket, levelling bulb and heavy metal bases. A special feature of this burette is the four-way stopcock which permits a permanent connection with the potash pipette, thus obviating the necessity of repeatedly connecting and disconnecting the pipette during the course of an analysis.....	25.00

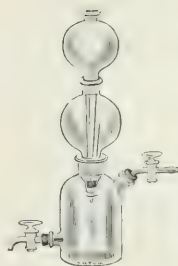


- 29540. Gas Cylinder, Low Pressure, Empty,** of steel, riveted and brazed, tested to 600 lbs. pressure to the square inch; with stopcock and coupling. These cylinders are for sale and are returnable for re-filling but not for credit.  
Size, inches ..... 10 x 32 13 x 44  
Capacity in cubic feet of oxygen at 225 lbs. pressure ..... 25 50  
Each ..... 16.50 22.50
- 29544. Gas Cylinder, High Pressure, Empty,** of seamless steel  $\frac{5}{8}$  inches in diameter by 51 inches high. Each cylinder is tested, numbered and stamped with the wording required by Paragraph 1822A of the Interstate Commerce Commission Regulations, which number is registered in New York with the Chief Inspector of the Bureau for the Safe Transportation of Explosives and other Dangerous Articles. These cylinders are sold outright only and are not returnable for credit. .... 15.00
- 29548. Gas Cylinder of Carbon Dioxide,** consisting of high pressure cylinder No. 29544 filled with 20 lbs. of Carbon Dioxide as used in connection with freezing microtomes and other laboratory purposes. Cylinders are returnable for re-filling only and not for credit. .... 18.00
- 29552. Gas Cylinder of Oxygen,** consisting of high pressure cylinder No. 29544 filled with 70 cubic feet of 99% pure electrolytic Oxygen (under 1800 lbs. at 68°F). Oxygen is absolutely free from the oxides of carbon, hydrocarbons and other deleterious impurities. As used in calorimetry, carbon combustions in steel analysis, etc. Cylinders returned for refilling only not for credit. .... 17.50
- 29556. Gas Cylinders of Oxygen.** These cylinders are filled with the indicated quantities of 97% pure Oxygen (S. S. White Dental Mfg. Co.) at 1000 lbs. pressure. These cylinders are only sold filled with Oxygen but are returnable when empty for either re-filling or credit at the prices indicated.  
Capacity, gallons ..... 40 100  
Each, filled with Oxygen ..... 8.15 17.00  
Cylinders returnable for credit at (charges prepaid) ..... 6.00 12.00
- 29557. Set of connections,** for above cylinders. .... 1.75
- 29560. Throttle Control Valve,** for the safe and accurate delivery of small quantities of gas from cylinders as required in the use of carbon dioxide in connection with freezing microtomes and in the delivery of oxygen in calorimetry and carbon combustions in steel analysis. .... 7.50
- 29564. Gas Pressure Regulator,** for maintaining a constant pressure of oxygen when delivered from pressure cylinders. These regulators will deliver oxygen or other gas uniformly at any desired pressure up to 40 lbs. per square inch. One of the dials shows the pressure at which the oxygen is delivered while the other shows the pressure remaining in the tank. .... 30.00
- 29568. Iron Support,** for high pressure Cylinder No. 29544. .... 4.00

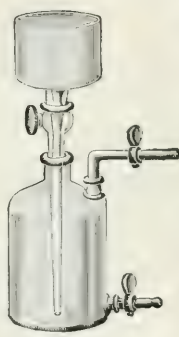
**Note.**—We undertake the refilling of Oxygen Cylinders No. 29556 with S. S. White Dental Mfg. Co. Oxygen at their original prices, i.e. 40 gallon cylinders at  $\frac{5}{8}$ ¢ per gallon and 100 gallon cylinders at  $\frac{5}{8}$ ¢ per gallon. We fill high pressure cylinders with 99% electrolytic Oxygen at  $\frac{5}{8}$ ¢ per cubic foot with the addition of all transportation and hauling charges which may be necessary. We also fill high pressure cylinders No. 29544 with 20 lbs. of Carbon Dioxide at \$3.00 per cylinder, with transportation and hauling charges added. Low pressure cylinders are best filled with Oxygen and Illuminating Gas for calcium lights at nearest supply establishment for gases of this character. The usual charge in large cities is \$3.00 for filling 25 gallon cylinders and \$5.00 for filling 50 gallon cylinders with Oxygen, and \$.50 and \$1.00, respectively, for the same cylinders filled with illuminating gas. We undertake such filling as an accommodation for our customers when necessary, but without responsibility on our part.



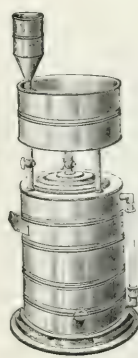
No. 29572



No. 29580

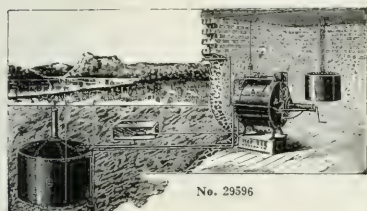


No. 29592



No. 29588


No.  
29600

No.  
29604


No. 29596



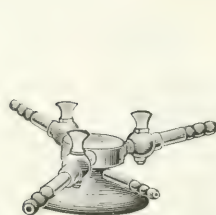
No. 29584



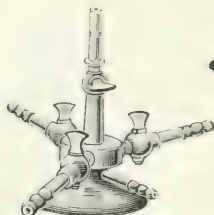
No. 29605

29572. **Gas Generator, Kipp**, improved form, for the continuous production of hydrogen sulphide; with large side opening for filling. Complete with Geissler stopcock, funnel tube, etc.  
Capacity, cc..... 250 500 1000 1500 2000 4000  
Each..... 3.50 4.00 5.00 6.00 7.00 9.00
29576. **Rubber Rings**, for use in the above generator to prevent the iron sulphide from falling into the lower chamber.  
To fit generator, cc..... 250 500 1000 2000  
Each..... .30 .35 .45 .60
29580. **Gas Generator, McCoy**. A steady gas pressure is maintained by delivering the acid in drops.  
Capacity, cc..... 1000 2000  
Each..... 8.00 10.00
29584. **Gasoline Gas Generator**, for operating one Bunsen burner or one blast burner in laboratories without gas supply. Must be used in connection with a foot blower or other form of blast apparatus. Dimensions  $4\frac{1}{2}$  inches diameter by 7 inches high and contains 14 lineal feet of evaporating surface..... 9.00
29588. **Gas Holders, Berzelius-Pepys**'s improved form, of heavy copper, with glass gauge.  
Capacity, liters..... 20 40  
Each..... 20.00 25.00
29592. **Gas Holder, Berzelius**, entirely of glass with ground fittings; capacity 8 liters..... 16.00
29596. **Gas Generator, Tirrill**, for generating gasoline gas for use in laboratories. This machine accomplishes the mixing outside and is permitted by all fire underwriters without extra cost. The gas delivered gives a white, absolutely smokeless flame without odor. It is composed of a generator placed in the ground 30 ft. from the building and buried 6 ft. under ground, a mixer placed near the generator 3 ft. under ground and an air pump placed in the cellar of the building. The machine can be operated by either weight or water. The above illustration shows the machine operated by weight. Any plumber or gas fitter can set the same up with the directions supplied.  
Number of burners..... 15 25 50 75 100  
Each..... 210.00 250.00 210.00 410.00 525.00
29600. **Gas Measuring Tubes**, of glass, graduated, closed at one end, without stopcock.  
Capacity..... 25 cc in  $\frac{1}{16}$ ths 50 cc in  $\frac{1}{16}$ ths 100 cc in  $\frac{1}{16}$ ths  
Each..... .65 1.00 1.50
29604. **Gas Measuring Tubes**, same as No. 29600 but with stopcock.  
Capacity..... 25 cc in  $\frac{1}{16}$ ths 50 cc in  $\frac{1}{16}$ ths  
Each..... 1.50 2.00
29608. **Gas Palladium Tube, Hempel**, for the absorption of hydrogen, with about 2 grams of palladium sponge.  
..... 5.00





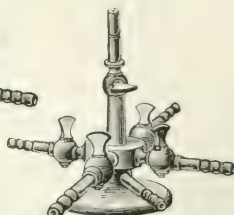
No. 29612



No. 29616



No. 29620

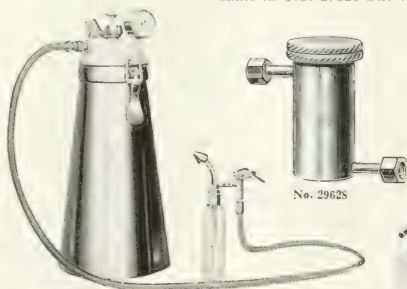


No. 29621

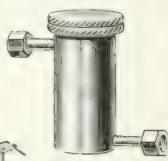
29612. Gas Distributors, of brass, with one supply pipe and three burner connections with stopcocks. 4.00  
 29616. Gas Distributors, of brass, same as No. 29612 but with burner in center. 4.75  
 29620. " " " " with gas supply pipe and four burner connections, with stopcocks. 4.75  
 29621. " " " " same as No. 29620 but with burner in center. 6.00



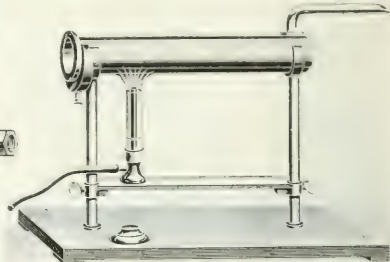
No. 29632



No. 29636

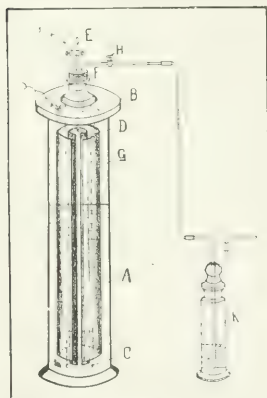


No. 29628



No. 29644

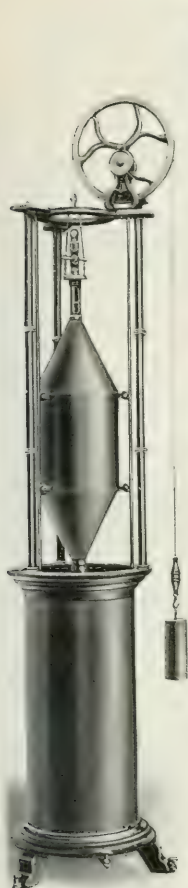
29628. Gas Filter, for use with either the Greenman or the Roux Bimetallic Thermo-regulators, to clean the gas of coal tar or other impurities, thereby securing more satisfactory working of the regulators. 5.00  
 29632. Gas Filter Tube, with projections to support paper thimble and ground in connecting tube. The upper connecting tube is 1 inch in diameter; without thimble. 2.00  
 29636. Gas Generator, "Autogenor," for generating oxygen, automatically producing an absolutely pure oxygen from oxone at any desired pressure up to 50 lbs. 45.00  
 29640. Oxone Cartridges, in tins each containing six round tablets, sufficient for  $4\frac{1}{2}$  cu. ft. of oxygen, for use in above. Per cartridge. 1.35  
 29644. Gas Generator, on stand with three flame Bunsen burner, 50 cm long. 12.00



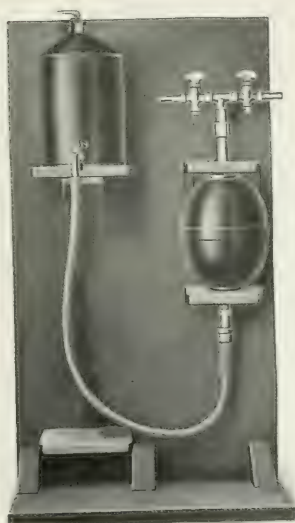
No. 29648

29648. Gas Generator, Electrolytic Oxygen and Hydrogen. By means of pure nickel electrodes and the use of 30% caustic soda solution as electrolyte, pure oxygen and hydrogen are generated in turn by reversing the poles of the battery. The oxygen is very pure, being particularly free from ozone. Height 7 cm by 15 cm in diameter. See *Zeitschrift für den physikalischen und chemischen Unterricht* (Poske) XXV.I. p. 69.

Duty Free	11.55
Duty Paid	16.20



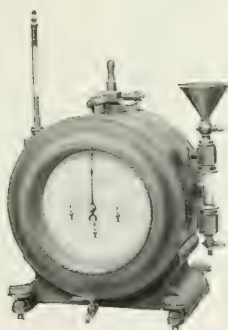
No. 29652



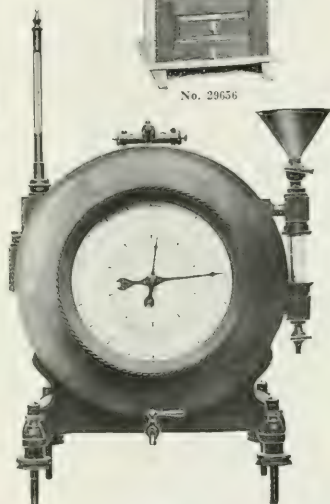
No. 29660



No. 29656

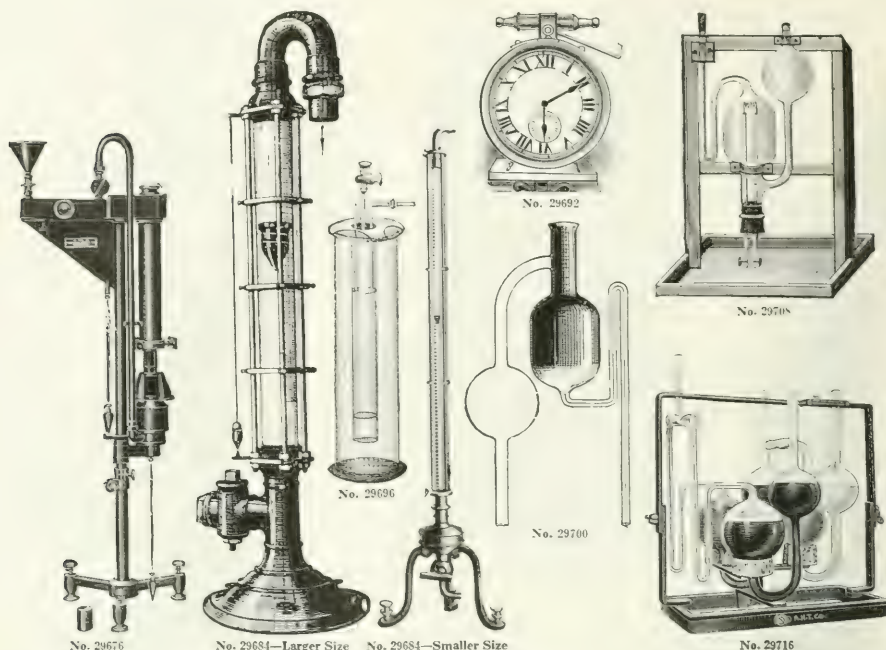


No. 29668

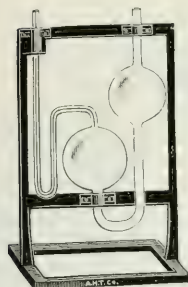


No. 29672

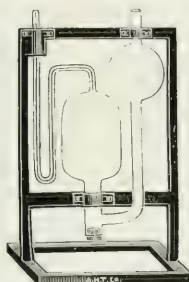
29652. **Cubic Foot Bottle**, immersion type, standardized by the U. S. Bureau of Standards. This instrument is the basis of all gas measurements; operating on the principle of displacing 1 cu. ft. of gas by a volume of 1 cu. ft. of water..... 125.00
29656. **Cubic Foot Bottle**, as above, cabinet form..... 275.00
29660. " "  $\frac{1}{10}$  on wooden stand, for testing the correction of the registration of gas meters. particularly the wet test meters as used for experimental purposes..... 55.00
29668. **Cubic Foot Bottle**, as above,  $\frac{1}{2}$  cu. ft. .... 55.00
29664. **Gas Meter**, a wet test laboratory meter with a  $\frac{1}{16}$  drum and a dial reading from  $\frac{1}{16}$ th of cu. ft. to 100 cu. ft. This meter is also furnished with a special dial having an hourly rate circle within the  $\frac{1}{16}$  circle. This rate circle reads from 0 to 6 ft. per hour. Complete with water gauge, thermometer, spirit level and levelling screws ..... 50.00
29672. **Gas Meter**, a photometer wet test meter, with a  $\frac{1}{2}$  cu. ft. drum and an hourly rate dial reading from 0 to 5 cu. ft. per hour. This is the meter mostly used in photometrical work. The meter makes one revolution of the drum per minute in accordance with the legal rate at which gas should be burned in ascertaining its candle power, i.e., 5 cu ft. per hour. With water gauge, thermometer, two spirit levels and levelling screws..... 50.00



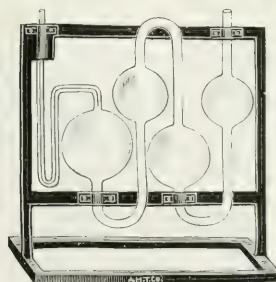
29676. Harcourt Pentane Lamp, model adopted as standard by the London Gas Referees with improvements as suggested by the U. S. Bureau of Standards. .... 75.00
29680. Harcourt Pentane Lamp, as above, with certificate of the Bureau of Standards. .... 87.50
29684. Gas Meter, "Rotameter," an accurate instrument for showing instantaneously with direct reading the volume of gas or liquid passed through it per hour. In ordering it is important to state the kind of gas to be measured, the maximum and minimum capacity in liters per hour, the pressure at which measurement is to be made, the diameter of the inlet and outlet tubes to which the Rotameter is to be connected and the temperature of the gas or liquid to be measured.
- |                                 |        |        |        |          |
|---------------------------------|--------|--------|--------|----------|
| Capacity, liters per hour. .... | .05-10 | 1-20   | 1-50   | 2-100    |
| Duty Free .....                 | 75.00  | 66.00  | 45.00  | 37.50    |
| Duty Paid .....                 | 100.00 | 88.00  | 60.00  | 50.00    |
| Capacity, liters per hour. .... | 10-200 | 30-300 | 50-500 | 100-1000 |
| Duty Free .....                 | 31.50  | 34.50  | 39.00  | 51.00    |
| Duty Paid .....                 | 42.00  | 46.00  | 52.00  | 68.00    |
29692. Gas Regulator, for shutting off the supply of gas at any desired time, consisting of a specially constructed clock with timing device and gas valve. The gas valve is connected by rubber tubing between the gas supply and the apparatus which it is to regulate. .... 4.00
29696. Specific Gravity Apparatus, Schilling, for illuminating gas. .... 18.00
29700. Gas Pipette, Hempel-Friedrichs, simple absorption, of reddish brown glass. See *Zeitschrift für angew. Chemie*, 1912. On metal stand. .... 4.50
29704. Glass Parts only for No. 29700. .... 3.00
29708. Gas Pipette, Winkler, for the determination of methane. On iron support, with platinum spiral. .... 7.50
29712. Glass Parts, only, with platinum spiral. .... 6.00
29716. Gas Pipette, Double Absorption for Cuprous Chloride, Standard U. G. I. Form. This pipette was designed to replace the two double absorption pipettes otherwise necessary in making a gas analysis. By simply turning the cock it is possible to bring the gas in contact with the absorbent contained in either side of the pipette without disconnecting. .... 10.50
29720. Glass Parts, only, for above. .... 7.50



No. 29724



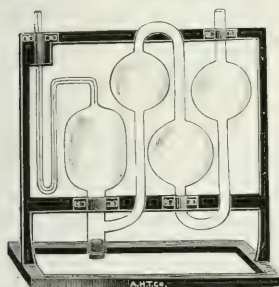
No. 29732



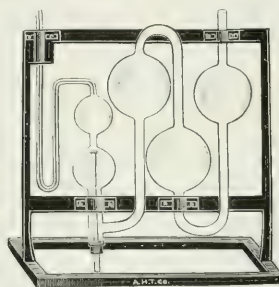
No. 29740

**GAS PIPETTES, HEMPEL**, mounted on improved iron supports with lacquered base. The glass parts are fastened to the supports by means of adjustable metallic clamps with cork inset. The adjustment permits of the use of glass parts of slightly varying dimensions. To avoid breakage iron supports and glass pipette are packed separately and must be set up in the laboratory.

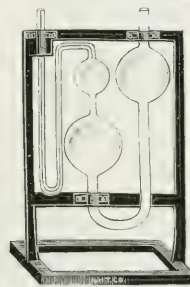
29724.	Gas Pipette, Hempel, simple absorption, for liquid reagents, on new form iron stand.....	3.00
29728.	Glass Parts only for No. 29724.....	1.25
29732.	Gas Pipette, Hempel, simple absorption, for liquid and solid reagents, on new form iron stand..	3.00
29736.	Glass Parts only for No. 29732.....	1.50
29740.	Gas Pipette, Hempel, compound absorption, for liquid reagents, on new iron stand.....	4.00
29744.	Glass Parts only for No. 29740.....	2.00



No. 29748

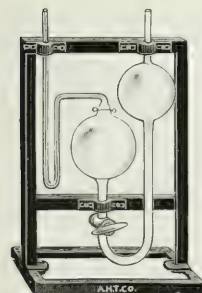


No. 29756

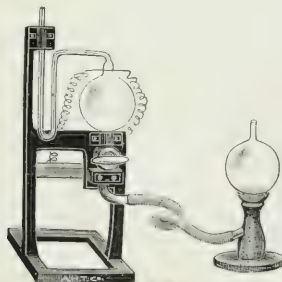


No. 29764

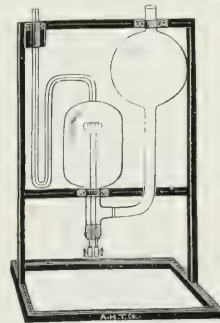
29748.	Gas Pipette, Hempel, compound absorption, for liquid and solid reagents, on new iron stand ....	4.00
29752.	Glass Parts only for No. 29748.....	2.25
29756.	Gas Pipette, Hempel, for the preparation of hydrogen, on new iron stand.....	5.00
29760.	Glass Parts only for No. 29756.....	3.00
29764.	Gas Pipette, Hempel, with glass beads for ethylene absorption.....	3.50
29768.	Glass Parts only for No. 29764.....	2.00



No. 29772



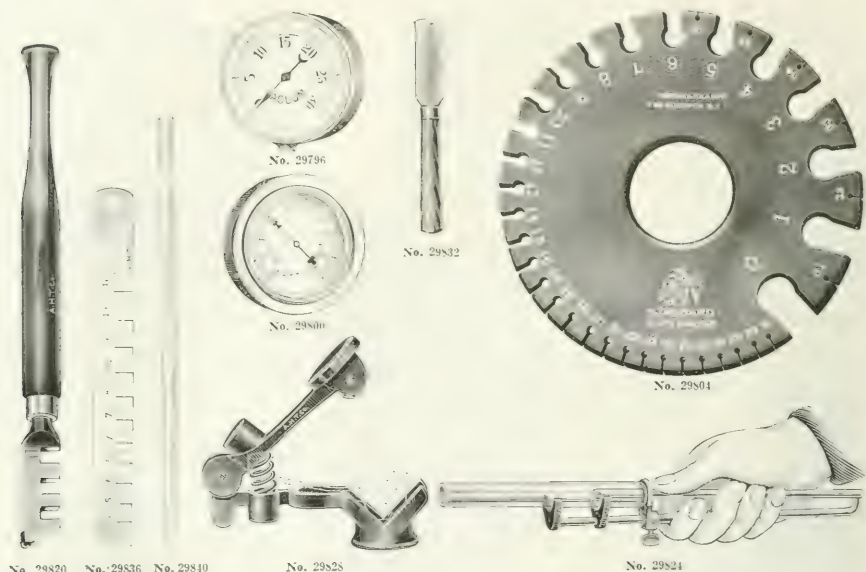
No. 29780



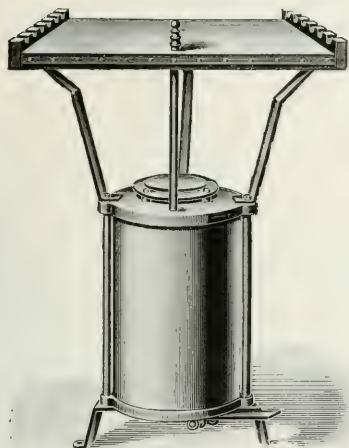
No. 29788

29772.	Gas Pipette, Hempel, simple explosion, with stopcock and platinum electrodes.....	6.00
29776.	Glass Parts only for No. 29772.....	3.50
29780.	Gas Pipette, Hempel, explosion, with platinum electrodes, stopcock and levelling bulb.....	7.00
29784.	Glass Parts only for No. 29780.....	4.25
29788.	Gas Pipette, Hempel, with platinum spiral, for methane, mounted on new iron stand.....	6.00

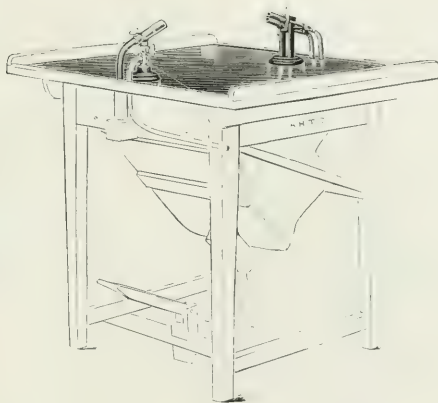




29792.	Gauge, Pressure, in brass case, reading in pounds. Suitable for steam, water or air pressure but when used with steam pressure must always be connected with syphon. May be graduated to any pressure not exceeding 500 lbs. Range must be specified in ordering. The 3 inch gauge connects on $\frac{1}{2}$ inch pipe thread and 5 inch gauge connects on $\frac{1}{4}$ inch pipe thread.			3	5
	Each.....	5.00	7.50		
29796.	Gauge, Vacuum, reading in inches to 30 inches of mercury. Otherwise similar to No. 29792. Dial 3 inches in diameter.				5.00
29800.	Gauge, Vacuum and Pressure, both on same dial, vacuum scale for 0 to 30 inches of mercury, pressure scale from 0 to 15, 30 or 60 lbs. Range must be specified in ordering. Exactly the same in construction as Nos. 29792 and 29796.				14.00
29804.	Gauges, Wire, American Standard, B & S, of best tempered steel.				
	Size.....	0 to 36	5 to 36		
	Each.....	2.50	2.00		
29808.	Glass Beads, solid, 3 to 6 mm in diameter. Per lb.....				.90
29812.	" hollow, 5 to 6 mm long by 4 to 5 mm in diameter. Per lb.....				.70
29816.	Glass Cutter, Diamond. Price depends upon quality of splint and varies from \$5.00 to \$20.00.				
29820.	" with small steel wheel.....				.20
29824.	" Tubing Cutter. Large size will cut tubing of $\frac{1}{8}$ to 1 inch in diameter in lengths up to 5 inches; small size will cut tubing $\frac{1}{4}$ inch diameter in lengths up to 5 inches.				
	Size.....	Small	Large		
	Each.....	1.50	1.50		
29825.	Extra cutter wheels. Per dozen.....				2.00
29828.	Glass Tubing Cutter, Griffin's form.				
	For tubes, mm in diameter.....	17	30		
	Each.....	1.00	2.00		
29832.	Glass Cutter, consisting of a hardened, sharpened steel knife with wooden handle. A most convenient and satisfactory laboratory utensil.....				1.00
29836.	Glass Tubing Gauge, of steel, very convenient for rapidly sorting glass or metal tubing by outside diameters. The slots vary in width by $\frac{1}{4}$ mm. These gauges come in three sizes, the size measuring from 5 to 11 mm being shown in the illustration.				
	Size, mm.....	1 to 5	5 to 11	11 to 16	
	Each.....	1.00	1.25	1.50	
29840.	Glass Tubing, heavy walled for sealing, so-called "Einschmelz" tubing				
	Length, mm.....	500	600	700	
	Diameter, mm.....	18	20	22	
	Each.....	.40	.45	.50	



No. 29844

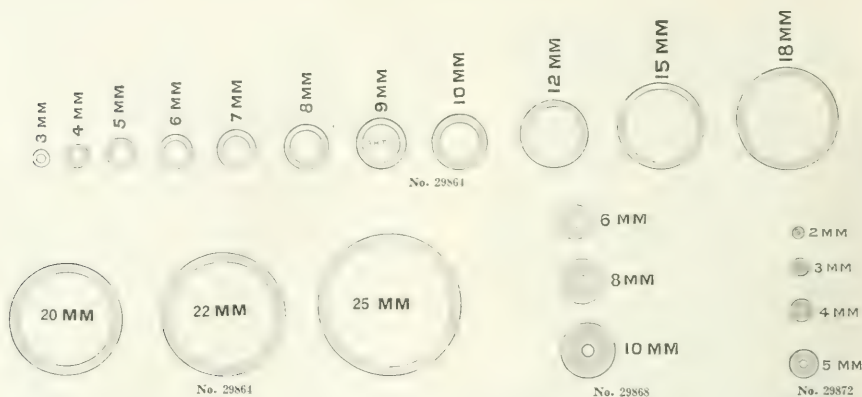


No. 29848

- |        |   |       |                      |
|--------|---|-------|----------------------|
| 29844. | Glass Blower's Table, consisting of an iron covered table top 75 x 75 cm, supported over a cylindrical foot bellows. Very convenient in the laboratory for glass-blowing as the blast lamp may be left permanently in place on the table without blast lamp or burner.  |       |                      |
|        | Duty Free.....  | 17.50 | Duty Paid..... 22.00 |
| 29848. | Glass-blower's Table, Thüringian model, with single and double blast burners, as shown in illustration, permitting the use of flame of all kinds as used in ordinary laboratory glass blowing. The use of this outfit makes laboratory glass blowing far easier of accomplishment than is possible with the use of ordinary blast lamp and foot blower. |       |                      |
|        | Duty Free.....  | 23.25 | Duty Paid..... 27.85 |
| 29852. | Glass-blower's Table, as above without burners.   |       |                      |
|        | Duty Free.....  | 13.80 | Duty Paid..... 16.50 |



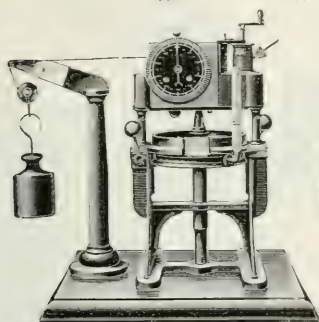
View in Stock Room Showing Adjustable Partitions on Right and Glass Tubing on Left



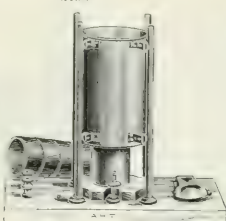
**GLASS TUBING AND ROD** is carried in stock in the original factory lengths of from 1½ to 2 meters. Customers are requested to state the length to which pieces may be cut for shipment. On small orders, particularly where factory length is not required, an extra charge is made for the special box required to insure safe transit. The following prices are based on tubing with usual factory variations as to bore, thickness of wall, etc. Where tubing must be selected to an exact measurement as to inside and outside diameter, an extra charge is made. **Specifications as to diameter of glass tubing are always taken to be outside diameter unless otherwise stated, except in the case of combustion tubing where it is customary to specify inside diameter in order to make sure same will take proper size combustion boat.**

29856.	Glass Rod, for easy manipulation before the lamp. From 1 to 25 mm diameter. Per lb.....	.40
29860.	Glass Stirrers, with one end rounded and the other end pointed.	
	Length, inches.....	$\frac{1}{2}$ $\frac{5}{8}$ $\frac{6}{8}$ 8    10    12    15
	Diameter, inches.....	$\frac{1}{16}$ $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{1}{2}$
	Per dozen.....	.20    .25    .30    .40    .60    1.00    1.15
29864.	Glass Bending Tubing, Best Imported. Particularly recommended for laboratory use because of the ease with which it can be manipulated before the lamp. Not to be confused with low priced, thin walled "trial" tubing of either German or American make.	
	Outside diameter, mm.....	1 to 4    5 to 20    21 to 35    36 to 50
	Per lb.....	.45    .40    .50    .60
29868.	Glass Tubing, Barometer, in three outside diameters, i. e., 6, 8 and 10 mm. Per lb.....	.70
29872.	Glass Tubing, Capillary, with very small outside diameters, i. e., approximately 2, 3, 4 and 5 mm. The 2 mm tubing has a capillary fine enough to be designated as thermometer tubing. The tubing of 3, 4 and 5 mm outside diameter has a bore of about 1 mm and differs from barometer tubing only in the outside diameter. Per lb.....	1.00
29876.	Glass Tubing Combustion, Kavalier Hard Bohemian. Dimensions given are inside dimensions in order to determine size suitable for various combustion boats.	
	Inside diameter, mm.....	3 to 8    9-25
	Per lb.....	1.10    1.00
29880.	Glass Tubing, Jena, Combustion, containing very little alkali. Very tractable in the blowpipe flame although as hard to fuse as the hardest Bohemian. Inside diameter, mm..	3 to 5    6 to 25
	Per lb.....	1.00    .75
29884.	Glass Tubing, Jena Apparatus Glass, adapted for work before the lamp in the manufacture of apparatus. Outside diameter 3 to 25 mm. Per lb.....	1.00
29888.	Glass Tubing, Jena Compound Robax Glass (registered trade-mark a light blue longitudinal line) for explosion furnaces, etc. Of great resistance to sudden temperature change, the action of water, acid or alkali solutions, etc. Outside diameter 12 to 25 mm. Per lb.....	.75
29892.	Glass Tubing, Jena Uriol Glass, of high transparency to ultra-violet rays and very thin wall. Imported to order only. Duty Free, per kilo.....	3.50
	Duty Paid, per kilo.....	7.00
29896.	Glass Tubing, Jena 397III Glass, adapted for the enclosure of platinum wire, so-called fusing-in glass. Outside diameter 5 to 12 mm. Per kilo.....	1.00
29900.	Glass Tubing, Jena Fiolax Glass, made especially for the manufacture of ampoules and other containers for sterilized solutions. Very resistant to alkalis under sterilization and at the same time easy to manipulate before the lamp. Trade-mark for white tubing a red line and for amber a white line. A very valuable tubing for laboratory work because of its resistance to alkalis. Outside diameter 10 to 18 mm. Per kilo.....	2.50
29904.	Glass Tubing, Thermometer, Jena 16III Glass, of great resistance power, almost entirely eliminating the periodical changes of the zero point. Registered trade-mark red longitudinal line with white background. About 5 to 6 mm outside diameter. Per lb.....	1.75
29908.	Glass Tubing, Thermometer, Jena Borosilicate 59III Glass, with white background with lowest possible temperature coefficient, i. e., 1° C. = .0000177. For the manufacture of thermometers to measure high temperatures, i. e., up to 500° C. About 5 to 6 mm outside diameter. Per lb.....	2.75

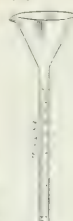
29904. Glass Tubing, Thermometer, Thüringian make, with white background. About 5 to 6 mm outside diameter. Per lb. 1.00
29908. Glass Wool, of best Bohemian spun glass. In original cartons.  
Quality..... A (wavy, coarse spun) FF (wavy, fine spun) B (smooth, free from lead)
- |                         |      |      |      |
|-------------------------|------|------|------|
| Per 25 gram carton..... | .40  | .40  | .40  |
| " 100 " " " " " " "     | 1.25 | 1.25 | 1.25 |
| " 500 " " " " " " "     | 5.00 | 6.00 | 4.25 |



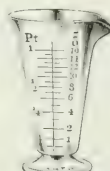
No. 29912



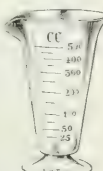
No. 29916



No. 29948



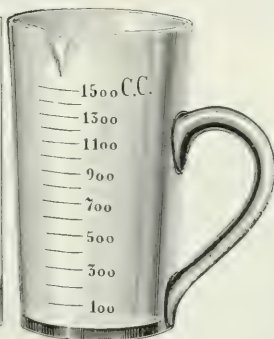
No. 29932



No. 29936



No. 29928



No. 29944



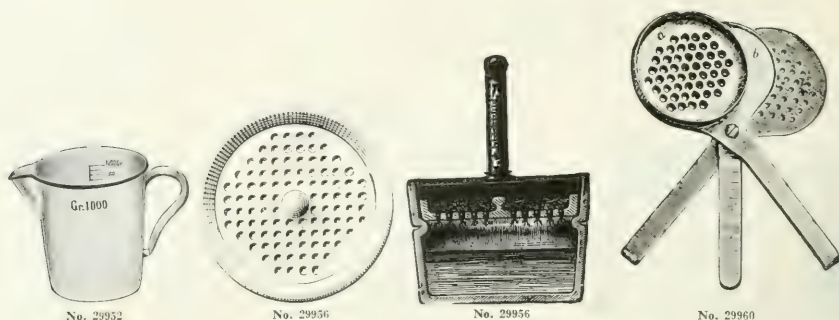
No. 29920



No. 29924

29912. Glue Testing Apparatus, Weiss (Consistency Meter) for measuring the consistency of rubber, sugar, sugar solutions, glue, gelatine, fats, oils, etc. The time of rotation of a horizontal disc under the impulse of a fixed weight is measured on the circular dial. 200.00
29916. Glue and Gelatine Tester, Alexander, of brass, with electric annunciator. See *Journal of the Society of Chemical Industry*, Feb. 28, 1906. 26.00
29920. Glue Viscosity Pipette, Alexander, with tripod, metal jacket, etc. 5.00
29924. Glue Tester, Scott, for testing the tensile strength of glue, gelatine, etc., and for making comparative tests of the hardness of greases, wax, etc., reading in pounds and fractions of ounces automatically. 25.00
29928. Goggles, gas tight and indestructible, with rubber fittings and removable, clear glass lenses. 1.50
29932. Graduates, Glass, of ordinary accuracy, graduated in ounces.
- |                       |                |               |               |               |     |     |      |      |      |      |
|-----------------------|----------------|---------------|---------------|---------------|-----|-----|------|------|------|------|
| Capacity, ounces..... | $\frac{1}{16}$ | $\frac{1}{8}$ | $\frac{1}{4}$ | $\frac{1}{2}$ | 1   | 2   | 4    | 8    | 16   | 32   |
| Each.....             | .18            | .22           | .28           | .35           | .40 | .70 | 1.20 | 1.40 | 2.00 | 2.00 |
29936. Graduates, Glass, of ordinary accuracy, graduated in cubic centimeters.
- |                   |     |     |     |     |     |      |
|-------------------|-----|-----|-----|-----|-----|------|
| Capacity, cc..... | 30  | 60  | 120 | 250 | 500 | 1000 |
| Each.....         | .25 | .28 | .35 | .50 | .80 | 1.40 |
29940. Graduates, Glass, of ordinary accuracy, graduated in ounces and cubic centimeters.
- |                         |                |               |               |               |      |      |       |       |       |       |
|-------------------------|----------------|---------------|---------------|---------------|------|------|-------|-------|-------|-------|
| Capacity, ounces.....   | $\frac{1}{16}$ | $\frac{1}{8}$ | $\frac{1}{4}$ | $\frac{1}{2}$ | 1    | 2    | 4     | 8     | 16    | 32    |
| " " " " " " " " " " " " | .30            | .60           | 1.20          | 1.50          | 2.50 | 5.00 | 10.00 | 15.00 | 25.00 | 32.00 |
| Each.....               | .32            | .35           | .50           | .60           | .75  | 1.10 | 2.00  | 2.50  | 4.00  | 5.00  |
29944. Graduate, Glass, 1500 cc capacity, graduated in cc. 1.25
29948. Graduate, with graduated stem, as used in moisture testing in wood that has been creosoted, etc. Stem is graduated to 12 cc in  $\frac{1}{16}$ ths. See Bulletin No. 134 of the U. S. Department of Agriculture, Forest Service. 1.20

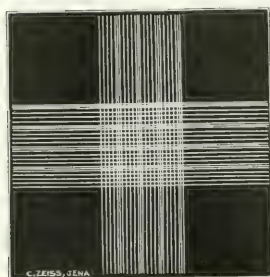




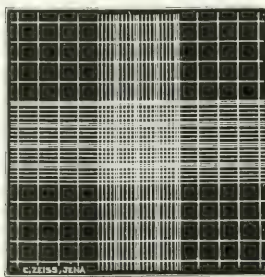
29952. **Graduates, Aseptic Enamel Ware**, of seamless steel, white enameled, both acid and fire proof; graduated in cubic centimeters on the inside.
- | Capacity, cc. | 500  | 1000 | 2000 | 4000 |
|---------------|------|------|------|------|
| Each          | 1.00 | 1.25 | 1.75 | 3.00 |
29956. **Grain Germinator, Schönjahn**, with thermometer; as used in determining the germinating power of barley, etc., in malting. For 100 grains. 4.00
29960. **Grain Tester, Grobecker**, of brass, for sectioning 50 grains. 6.00

# APPARATUS FOR HAEMATOTOLOGY

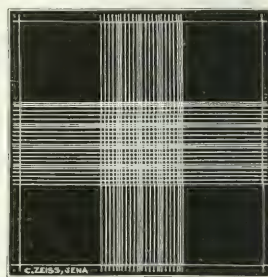
Diagrams Showing the most used Haemacytometer Rulings



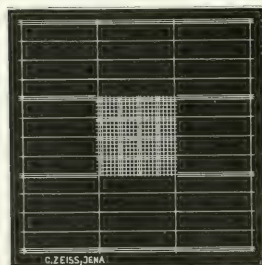
Thoma Ruling



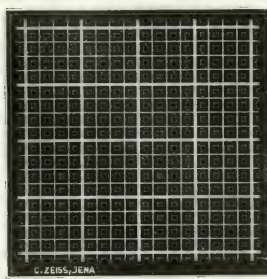
Neubauer Ruling



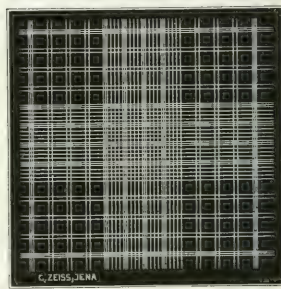
Zappert Ruling



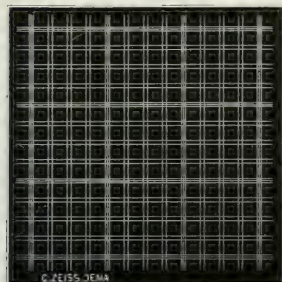
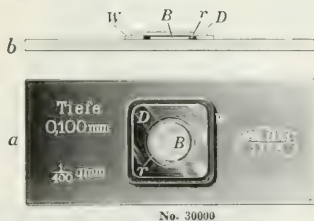
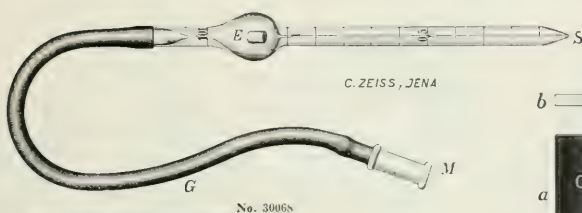
Breuer Ruling



Fuchs and Rosenthal Ruling



Türk Ruling



Bürker No. 1 Ruling

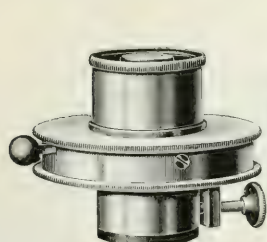
No. 30088

**HAEMACYTOMETERS, ZEISS.** We particularly emphasize the advantage of using the original Zeiss make of Thoma Haemocytometers and all modifications thereof; our experience having shown that the cheaper makes are inferior and never satisfactory as to accuracy. Our stock of Haemocytometers, with the exception of the Hayem-Sahli and the Thoma-Metz, is confined entirely to the Zeiss product. The counting chambers when sold separately are supplied without leather case but with one each thick and thin cover glasses. They are all of 1 mm depth, excepting the Helber and Fuchs-Rosenthal. The various rulings are shown in illustrations on preceding page.

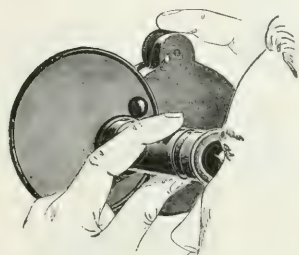
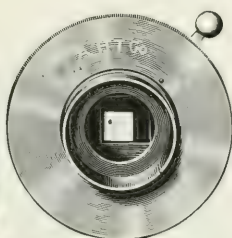
30000.	Counting Chamber, Thoma ruling, with two cover glasses but without case.....	4.50
30004.	" " Zappert " " " " " " " " " "	4.70
30008.	" " Türk " " " " " " " " " "	6.30
30012.	" " Breuer " " " " " " " " " "	5.60
30016.	" " Bürker No. 1 ruling. The chamber is provided with two counting surfaces separated by a cross channel so that two countings can be done one shortly after the other. The rectangular cover glass is placed in position before introducing the blood mixture, the drops are placed upon the semicircular prominence of the middle plate and flow from thence by capillary attraction upon the counting surfaces. With cross lines divided on both counting surfaces.....	7.40
30020.	Counting Chamber, Bürker No. 1 ruling, but with spring clamps to hold cover glass in position.....	11.00
30024.	Counting Chamber, Bürker No. 2, the counting surfaces of which are not provided with cross line divisions. Counting is done by means of special ocular diaphragms; the value of the square aperture of these diaphragms can be estimated by the stage micrometer (1 mm divided into 100 parts) cemented alongside the counting chamber. With three ocular diaphragms.....	8.85
30028.	Counting Chamber, Bürker No. 2 ruling but with spring clamps to hold cover glass in position.....	11.70
30032.	Counting Chamber, Special, with two counting surfaces as in the Bürker No. 1 but with the surfaces ruled with the Neubauer ruling. As made specially for us by Zeiss and as used in the Clinical Laboratory at Johns Hopkins University Medical School.....	11.70
30036.	Counting Chamber, Helber, for counting blood platelets, yeast cells, bacteria, etc. With Thoma ruling but with counting cell 0.02 mm in depth instead of 0.1 mm.....	4.85
30040.	Counting Chamber, Fuchs and Rosenthal, for cytological investigations of the cerebro-spinal fluids, with counting chamber 0.2 mm deep.....	4.70
30044.	Leather Cases, of morocco, velvet lined, for any of the above counting chambers.....	.55
30048.	Cover Glasses, for above counting chambers, square 4 mm thick.....	.20
30056.	" " " " Bürker counting chambers, rectangular, 0.3 mm thick.....	.25
30060.	" " " " " " " " " " 0.5 mm " ".....	.25
30064.	Mixing Pipette, Thoma, for red corpuscles, diluting 1 to 100; with rubber tube and mouth piece.....	1.80
30068.	" " " " " " " " " " " " for white corpuscles, diluting 1 to 10; with rubber tube and mouth piece.....	1.80
30072.	" " " " Rieder, for diluting 1 to 20; with rubber tube and mouth piece.....	2.90
30076.	" " " " Miescher, for diluting 1 to 100, 1 to 150 and 1 to 200; with rubber tube and mouth piece.....	4.30
30080.	" " " " " " " " " " " " for diluting 1 to 200, 1 to 300 and 1 to 400, with rubber tube and mouth piece.....	4.30
30084.	Fluid Chamber, Bürker, for use on Bürker's counting chambers.....	.75







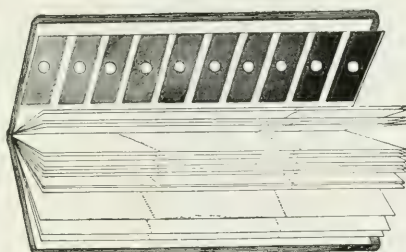
No. 30111



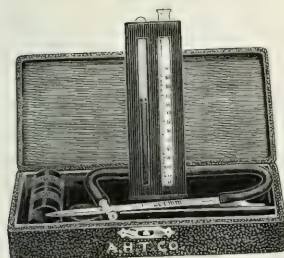
No. 30152



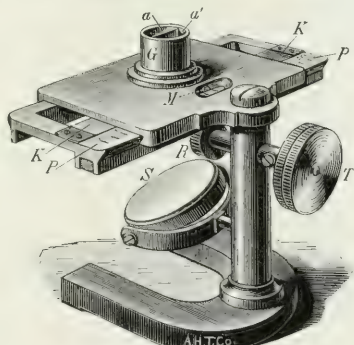
No. 30148



No. 30156



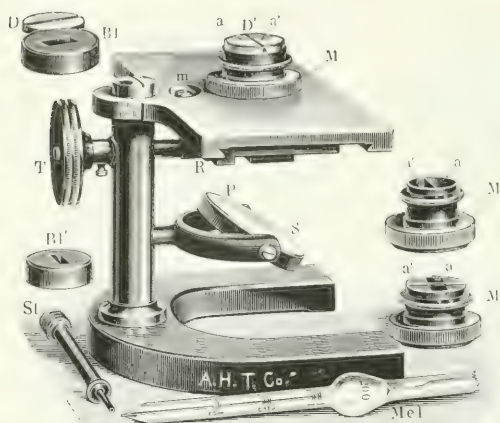
No. 30160



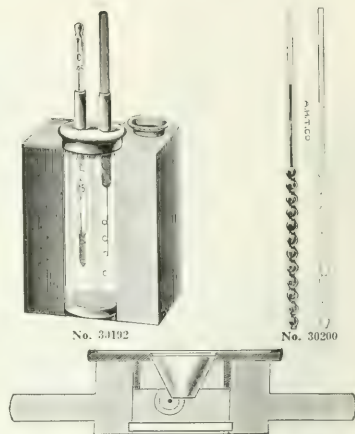
No. 30176

30144. Ocular, Ehrlich, with adjustable square diaphragm for use in blood counting, cytology, etc. .... 11.40
30148. **Haemocytometer, Thoma-Metz**, consisting of a counting ocular, counting slide, plano cover glass, pipette for red corpuscles and pipette for white corpuscles. The usual graduations on the counting chamber are omitted and are provided in the ocular which is adjusted for use with a 4 mm objective. Small variations in the focus of the objective may be compensated for by adjustment of tube length. This adjustment is controlled by the coincidence of the counting plate with a square engraved on the slide. In case..... 16.00
30152. **Haemoglobinometer, Dare**, complete in leather case..... 22.50
30156. **Haemoglobin Scale, Tallquist**. A color scale of ten tints, ranging from 10% to 100%, bound in book form, pocket size, complete with 50 sheets of standard filter paper sufficient for 150 tests, and directions for use..... 1.50
30160. **Haemometer, Sahli**, original Swiss make being constructed under Dr. Sahli's personal supervision and not to be confused with the many unsatisfactory imitations at a lower price. Complete with directions for use..... 7.50
30164. **Standard Colored Tubes** for above, each..... 1.25
30168. **Graduated Tubes** for above..... 1.25
30172. **Graduated Pipette** for above..... 1.25
30176. **Haemometer, Fleischl**, for measuring the percentage of haemoglobin in blood. The standard of comparison in this instrument is a tinted wedge of glass mounted movably beneath the stage. Only a small quantity of blood is required and the results are obtained easily and quickly. Complete in case with lock and handle..... 24.00



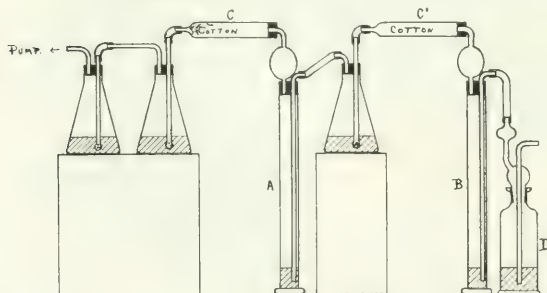


No. 30180



No. 30196

30180. **Haemometer, Fleischl-Miescher**, for estimating the absolute as well as the relative percentage of haemoglobin content of blood with great accuracy. Complete with cells, mixing pipette, etc. 45.00
30184. **Capillary Tubes for Fleischl Haemometers** of varying capacities to suit wedge of instrument. Capacity in cubic millimeters. Each..... .30
30188. **Yellow glass disc**, for use with Fleischl haemometers in day light. Each..... .175
30192. **Coagulometer, Biffi-Brooks**. Complete with thermometer..... .8.00
30196. **Coagulometer, Brodie-Russell-Boggs**, for use on the stage of the microscope. See *Johns Hopkins Hospital Bulletin*, June-July, 1907..... .9.00
30200. **Coagulometer, Schultz**, consisting of small glass tubes each with 14 bulbs, which may be broken off readily with the fingers for introduction into the normal salt solution. A simple and convenient method for determining coagulation time of blood. See *Berliner klin. Wochenschr.*, 1910, No. 12. Each..... .20

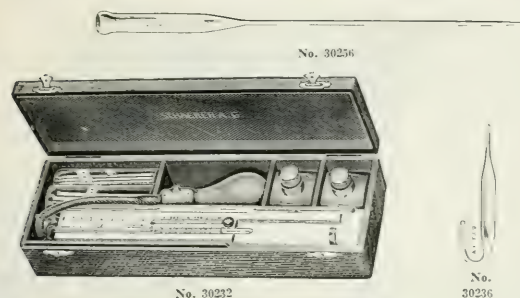


No. 30204

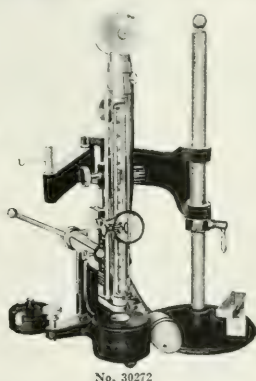
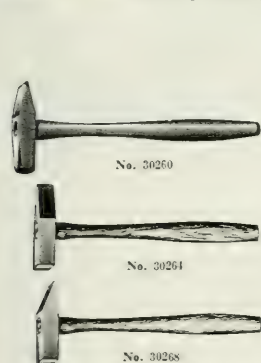


No. 30224

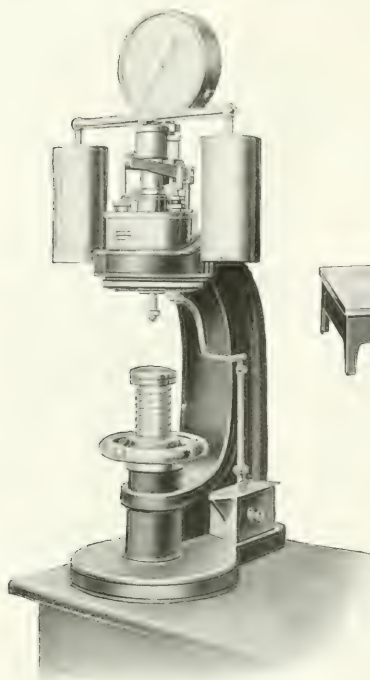
30204. **Apparatus for the Determination of Urea in the Blood, Marshall**. Complete outfit as shown in the illustration consists of two calcium chloride tubes, two Erlenmeyer flasks, two cylinders, one gas washing bottle, two rubber stoppers to fit cylinders, one Chapman filter pump, three special Folin tubes with perforations in bulb, three glass bulb connecting tubes, tubes for connecting flasks and tubes to reach to the bottom of the cylinders with necessary hose, etc. See *Journal of Biological Chemistry*, Vol. XV, No. 3, September, 1913. Complete outfit..... 7.00
30208. **Folin Tube** with perforated bulb, for above, each..... .15
30212. **Bulb Connecting Tube**, for above, each..... .30
30216. **Connecting Tubes**, short, for connecting flasks, for above, each..... .10
30220. " " long, to reach bottom of cylinders, for above, each..... .10
30224. **Stalagmometer, Traube**, for determining the surface tension of fluids by the number of drops formed by a given volume in a given time and as used for the small drop reaction in the diagnosis of typhoid vaccines and other studies in immunity. See *Biochem. z. März, 1910, Münch. med. W. 5762, 1910 and Journal of the American Medical Association, May 28, 1910*. Complete outfit consisting of three accurately calibrated glass tubes one each for small quantities of thin liquids, large quantities of thin liquids, and one specially for blood and other more viscous solutions.. 16.00
30228. **Stalagmometer Tubes**, as above, if ordered singly, each..... 7.50



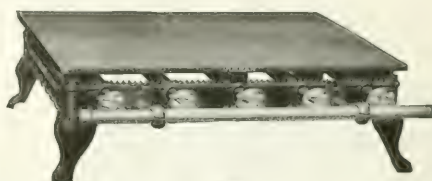
30232. Viscosimeter, Hess, for determining the viscosity of blood. Complete in case, with instructions for use. 22.25
30236. Blood Capsules, Wright, of soft glass,  $2\frac{1}{2}$  inches long. Per 10. .50
30240. Blood Collector, Vacuum, as devised by Dr. Keidel for collection of blood for Wasserman and other tests, consisting of an ampoule of 5 cc capacity from which the air has been exhausted, a piece of rubber tubing, a syringe needle and a glass tube to protect needle after sterilization. Per dozen. 2.40
30244. Blood Lancet, Swan, for drawing blood. .25
30248. Blood Lancet, English form, single end, with guard screw to regulate depth of stab. 1.00
30252. " " double end, with both points protected for carrying in the pocket. 1.50
30256. Blood Pipettes, Wright, of soft glass with end rounded for convenient application of rubber tube and carefully drawn point; length  $7\frac{1}{2}$  inches over all. Per 10. .50



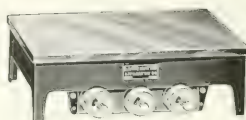
30260. Hammers, of solid cast steel, wedge shaped, for breaking ores.
- |                     |     |     |      |     |
|---------------------|-----|-----|------|-----|
| Weight, ounces..... | 7   | 10  | 18   | 26  |
| Each.....           | .50 | .60 | 0.80 | .90 |
30264. Hammers, for geologists, of solid cast steel, with edge parallel to handle.
- |                     |     |      |      |
|---------------------|-----|------|------|
| Weight, ounces..... | 14  | 20   | 28   |
| Each.....           | .75 | 1.00 | 1.25 |
30268. Hammers, for geologists, of solid cast steel, with edge at right angle to handle.
- |                     |     |     |     |
|---------------------|-----|-----|-----|
| Weight, ounces..... | 11  | 16  | 20  |
| Each.....           | .60 | .75 | .90 |
30272. Hardness Tester (Scleroscope), for measuring the hardness of metals. A miniature trip hammer is dropped from a fixed height upon the surface of the metal the hardness of which is to be tested. The height of the rebound of this hammer depends on the hardness or amount of resistance to penetration offered by the metal, and is measured by the Scleroscope scale. In addition to the Scleroscope proper the outfit consists of one plaster-mount vessel, one nicked and enameled swing arm and stand, one magnifier, hammer for soft metals only, one brass and one hard steel standard reference bars, 50 blank curve charts, all in polished hardwood carrying case. 150.00
30276. Hardness Tester, Keen, a simple portable instrument for testing the hardness of metals, the readings of which may be easily converted into approximately the Brinnell hardness numerals. A standard weight drops from a standard height, delivering a blow of constant magnitude on a socket in which is mounted a hardened steel ball. The indication on the piece to be tested is measured with a small celluloid gauge graduated to  $\frac{1}{16}$  mm or with a microscope. The instrument weighs only 6½ lbs., is thoroughly portable and is finished with highly polished nickel plate. Complete with three extra hardened steel balls and measuring scale. 18.00



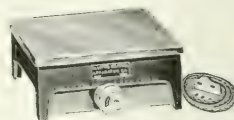
No. 30250



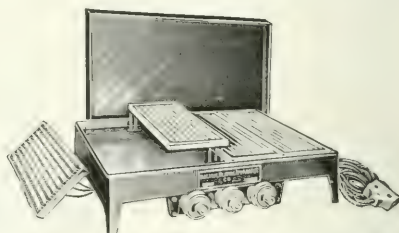
No. 30288



No. 30296—Three Heat



No. 30296—Single Heat



No. 30296—With top removed, showing replaceable heating units

30280. **Hardness Tester, Brinell**, for use in making Brinell's ball impression test or Ludwik's test by conical impressions. This method is standard throughout the world and gives numerical values of the hardness of materials without elaborate preparation, and insofar as iron and steel are concerned, the tensile strength as well. Some of the applications of this instrument are as follows:—

Rapid control of chemical carbon determinations during iron and steel smelting.

Testing finished articles without damaging the same, say rails, tires, projectiles, armor plates, gun barrels of all kinds, structural steel, etc.

Examining the nature of the material in entire or broken parts of machinery, where the making of a tensile test bar is impossible.

Testing the degree of hardness and softness obtainable by thermal treatment of any steel.

Testing uniformity of temper.

Ascertaining the effect of the nature and temperature of various hardening fluids.

Studying the effect of cold working, etc., etc.

For a maximum pressure of 3000 kilograms.

Duty Free..... 210.00

Duty Paid..... 250.00

30284. **Hardness Tester, Brinell**, as above, for a maximum pressure of 5000 kilograms.

Duty Free..... 235.00

Duty Paid..... 280.00

30288. **Hot Plates**, for gas, with extra heavy polished steel top.

Length, inches..... 18 24 30 36

Width, inches..... 14 18 18 18

Each..... 12.00 16.80 21.60 26.50

30296. **Hot Plates, Electric, "Multiple Unit" Type**, wound for 110 and 220 volts interchangeably. Size  $6\frac{1}{2}$  x 18 inches reaches 400° F. on low heat, 600° F. on medium and 750° F. on high heat, and consumes 330, 660 and 990 Watts, respectively, for these temperatures.

Size, inches.....  $12\frac{1}{2}$  x  $12\frac{1}{2}$   $12\frac{1}{2}$  x 18 18 x 24  $6\frac{1}{2}$  x 18

Each, one heat..... 17.50 24.50 34.00 15.00

Each, three heats..... 20.00 27.50 37.50 17.50

Extra Units, each..... 3.25 4.00 4.00 2.50

Rewiring Units, each..... 2.50 3.00 3.00 2.00

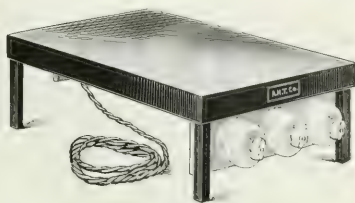




No. 30300



No. 30301



No. 30308

- 30300. Hot Plate, Hoskins Electric**, with heating elements of nickel-chromium. With 500 watts gives a maximum temperature of 483° C. With pressed steel top 6 inches in diameter. Works equally well on alternating or direct current but voltage must be specified in ordering. Furnished with six feet of flexible cord and plug. Requires use of 5 ampere snap or knife switch..... **6.00**
- 30304. Hot Plate, Hoskins Electric**, with polished sheet steel top and cast iron legs. Spiral resistance unit covers circular area 5½ inches in diameter in center of top, 12 inches square. Gives maximum temperature with 500 watts of 260° C. at center and 121° C. at edge. Works equally well on direct or alternating current but voltage must be specified in ordering. Furnished with 6 ft. of flexible cord and plug. Requires 5 ampere snap or knife switch for operation..... **8.00**
- 30308. Hot Plate, Hoskins Electric, Three Heat**, with polished sheet steel top 12 x 18 inches, with square steel legs. Resistance unit composed of three parallel windings, each controlled by a snap switch on front of plate. Heat distribution is absolutely uniform. At "Low" heat with 600 watts gives 177° C., "Medium" with 1200 watts gives 232° C. and "High" with 1800 watts gives 288° C. Works equally well on direct or alternating current but voltage must be specified in ordering. Requires use of a double pole knife switch 20 amperes capacity on 110 volts, and 10 amperes on 220 volts..... **25.00**



Nos. 30316 and 30320



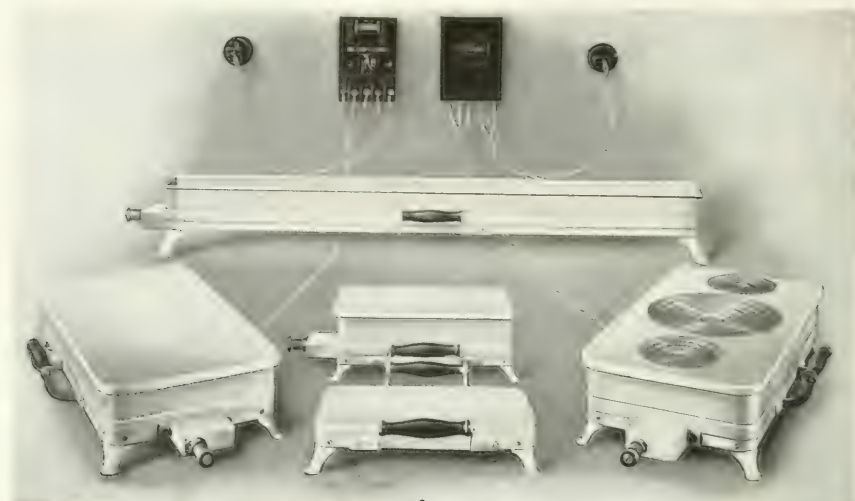
Nos. 30324 and 30328



No. 30332

- 30312. Hot Plate, Electric, Three Heat**. Furnished with regulating switch, 5 ft. of flexible cord and snap switch. Gives maximum temperature of 315° C. when running idle. Of polished steel. Operates equally well on direct or alternating current but voltage must be specified in ordering.
- |                     |             |              |
|---------------------|-------------|--------------|
| Length, inches..... | 6           | 6            |
| Width, inches.....  | 6           | 12           |
| Each.....           | <b>9.00</b> | <b>11.00</b> |
- 30316. Hot Plates, Electric, Three Heat**, circular form, of polished steel with slate base, with regulating switch. All are furnished with 6 ft. of flexible cord and the 4½ and 6 inch sizes with a lamp socket plug. No socket plug is furnished with the 8 inch size but a plug switch is furnished with the 10 inch. Operate equally well on direct or alternating current but voltage must be specified in ordering. Maximum surface temperature on "High" heat when running idle about 340° C. For arrangement to use these heaters in connection with Extraction Apparatus, No. 27504.
- |                       |             |             |              |
|-----------------------|-------------|-------------|--------------|
| Diameter, inches..... | 4½          | 6           | 8            |
| Each.....             | <b>6.00</b> | <b>7.50</b> | <b>10.00</b> |
|                       |             |             | <b>13.00</b> |
- 30320. Hot Plate, Electric**, circular form, for single heat, with 6 ft. of cord and lamp socket plug but without regulating switch. Diameter, 4½ inches. Of polished steel on slate base. Gives surface temperature when running idle on 250 watts of about 340° C. Operates equally well on direct or alternating current but voltage must be specified in ordering..... **4.00**
- 30324. Hot Plates, Electric**, rectangular form, for one heat. Of polished cast iron. Furnished with 4 ft. of cord but no plug. Will reach about 340° C. when running idle. Operate equally well on direct or alternating current but voltage must be specified in ordering.
- |                     |              |              |
|---------------------|--------------|--------------|
| Length, inches..... | 12           | 18           |
| Width, inches.....  | 9            | 12           |
| Each.....           | <b>11.00</b> | <b>16.50</b> |
- 30328. Hot Plate, Electric**, rectangular form, same as No. 30324 but with three heats and furnished with 4 ft. of cord and plug switch. Operates equally well on direct or alternating current but voltage must be specified in ordering.
- |                     |              |              |
|---------------------|--------------|--------------|
| Length, inches..... | 12           | 18           |
| Width, inches.....  | 9            | 12           |
| Each.....           | <b>13.00</b> | <b>18.50</b> |
- 30332. Hot Plate, Electric**, long form, with three moderate heats, very suitable for extraction apparatus such as No. 27508. With 5 ft. of cord and snap switch. Operate equally well on either direct or alternating current but voltage must be specified in ordering.
- |                     |              |              |
|---------------------|--------------|--------------|
| Length, inches..... | 24           | 24           |
| Width, inches.....  | 2½           | 4½           |
| Each.....           | <b>13.00</b> | <b>13.50</b> |





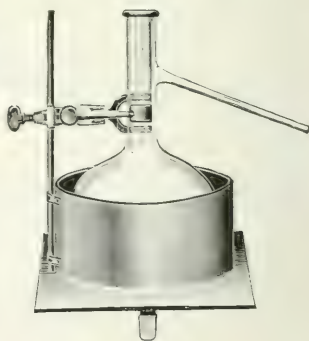
No. 30336

**HOT PLATES, HERÆUS PATENT, WITH AUTOMATIC TEMPERATURE REGULATION.** These plates are of aluminum with heating element of sheet Nichrome and reach a maximum temperature of 250°C. A micrometer screw is set to any temperature desired below the maximum, after which the plate will maintain the desired temperature to within 1° without attention, all of which is accomplished without the use of rheostats. The plates are listed below both without regulator and with regulator for both alternating and direct circuits. As the heating element is contained in an air box 2 inches deep the hot plate proper can be removed and replaced with a plate with aluminum rings at extra price.

Size of plate, cm.		12½ x 25	12½ x 50	20 x 40	25 x 50	10 x 85
Maximum current consumption, Watts		400	900	1200	1800	1300
30336.	Hot Plate, as above, without regulator	Duty Free 11.50	17.00	18.50	25.00	23.00
		Duty Paid 16.10	23.80	25.90	35.00	32.20
30337.	“ “ “ “ with regulator for D.C.	Duty Free 22.00	27.50	28.50	35.50	33.50
		Duty Paid 30.80	38.50	39.90	49.70	46.90
30338.	“ “ “ “ with regulator for A.C.	Duty Free 24.00	29.00	30.00	37.00	35.50
		Duty Paid 33.60	40.60	42.00	51.80	49.70
30340.	<b>Aluminum Rings, for above Hot Plates.</b>					
	Diameter of largest size, cm.		9	12	15	18
	Number of rings in set.		4	5	6	7
	Duty Free, per set.		.80	1.00	1.20	1.40
	Duty Paid, “ “		1.15	1.40	1.70	2.00

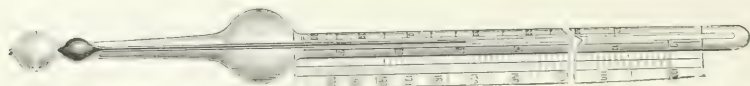


No. 30344

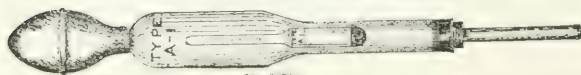


No. 30344





No. 3035



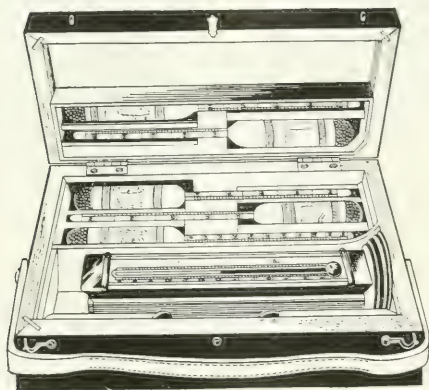
No. 3035b



No. 30360 Fig. 1



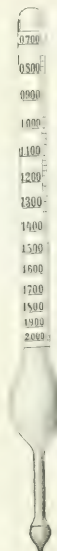
No. 30516



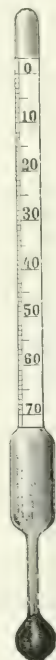
No. 30462



No. 30360 Fig. 2



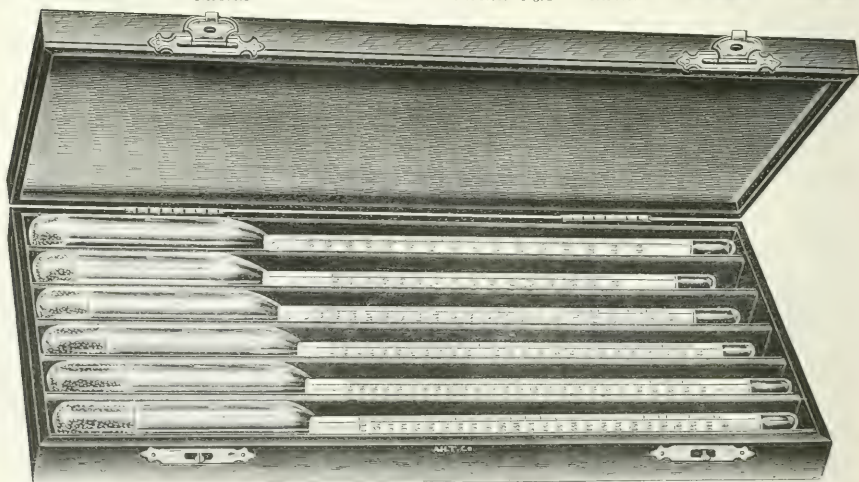
No. 30380



No. 30388

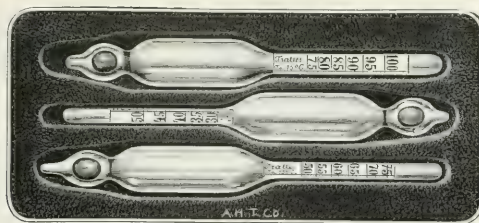


No. 30384



No. 30444

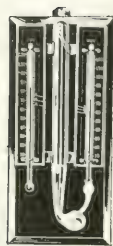




No. 30476

30444. **Hydrometers, Precision**, reading in specific gravity to the third decimal place. Set of six, 0.700-0.850, 0.850-1.000, 1.000-1.250, 1.250-1.500, 1.500-1.750 and 1.750-2.000. With separate thermometer in case. Spindles are not sold separately. In wooden case..... 15.00
30448. **Hydrometers, Precision**, complete set as in No. 30444 but with certificate of the Physikalisch-Technische Reichsanstalt. In wooden case..... 21.00
30452. **Hydrometer, Baume**, of German Silver, for liquids heavier than water, scale 0-50° in 1°..... 4.50
30456. **Hydrometer, Alcohol, Gay-Lussac**, scale from 1°-100° in single degrees..... 1.00
30460. " **Tralle and Proof Scales** reading from 100° below to 100° above Proof and from 1° to 100° Tralle in single degrees..... 1.00
30464. **Hydrometer, Alcohol, Tralle and Proof Scales** as in No. 30460 and also with enclosed thermometer. U. S. Custom House standard pattern..... 2.00
30468. **Hydrometers, Alcohol, U. S. Internal Revenue Bureau Pattern**, covering the entire range of spiritous liquors. No. 1, 0-100°; No. 2, 80-120°; No. 3, 100-140°; No. 4, 130-170°; No. 5, 160-200°. Each..... 2.50
30472. **Hydrometers, Alcohol, Complete Set**, as above, in polished wooden case with leather lining, including one copper spirit can with standard thermometer..... 24.00
30476. **Hydrometers, Alcohol, Plate**, Set of three hydrometers 9 cm in length, for testing alcohol in museum jars and biological work without the inconvenience of pouring off a sufficient quantity to float the usual large hydrometer. Reading from 30 to 100% volume and tested in the Zeiss laboratories. In handsome case..... 5.00
30480. **Hydrometer, Ammonia**, 35-10° Baume scale in  $\frac{1}{2}$  divisions..... .75
30484. " **Sommer's Patent**, for determining the specific gravity of Asphalt, graduated from 0.85 to 1.3° at 25° C., as recommended by the Committee of the American Society of Civil Engineers. Complete with brass receptacle and fittings, with instructions for use..... 10.00
30488. **Hydrometer**, same as No. 30484, but graduated from 0.950 to 1.100°..... 10.00
30492. " **(Barkometer)** for tanning liquids reading from 0-60° Baume in single degrees..... 1.00
30496. **Hydrometer**, same as above but with thermometer and correction scale..... 2.50
30500. **Hydrometer (Barkometer)** reading from 0 to 60° Baume in single degrees with Fahrenheit thermometer to 90°, scale about 5 inches long..... 2.00
30504. **Hydrometer, Benzene**, also for coal oil, gasoline, naphtha, etc., scale 90-60° Baume reading in single degrees. Each..... 2.75
30508. **Hydrometer Ether**, reading from 0.75 to 0.700 Specific Gravity, with enclosed thermometer..... 2.75
30512. **Hydrometer Glue**, graduated from 0-12° in 1°..... 1.25
30516. **Hydrometer, Lime-sulphur**, for use in determining the degree of density of lime-sulphur solutions, as recommended by Parrott and Stewart; scale is from 0 to 38° Baume and from 1.000 to 1.350 specific gravity, without cylinder..... .75
30520. **Hydrometer**, as above, with special cylinder..... 1.00
30524. **Special Cylinder** only..... .40
30528. **Hydrometer, (Salinometer)** with direct reading in percentage of salt content, range from 1 to 100% in  $\frac{1}{4}$  divisions..... .75
30532. **Hydrometer, Storage Battery**, with specific gravity scale, with range 1.100 to 1.300 and 7 inches in length. Each..... .75
30536. **Hydrometer, Storage Battery**, with syringe. The pointed tube of the syringe is inserted in the storage cell opening and the electrolyte withdrawn by means of the bulb. The specific gravity is then read by the hydrometer floating in the cylinder of the syringe without the use of another container. Reading from 1175 equals total exhaust of battery to 1300 equal full charge..... 1.75
30540. **Hydrometer, Sugar and Syrup**, "sweet water spindle," Brix scale, -5 to +5° in  $\frac{1}{4}$ ths..... 1.25
30544. " **Morse's Rendimento**, for tropical cane sugar factories. A special hydrometer with thermometer combined, for determining the possible yield of sugar from the cane by the density of the raw juice. The hydrometer shows how much sugar to expect and, by comparing this with the actual yield, the efficiency of the factory work can be estimated..... 6.00
30548. **Hydrometer, Sugar and Syrup**, Baume scale graduated in single degrees; 0-20° and 0-50°. Each..... .75
30552. **Hydrometer, Saxe's Aereo-Pycnometer**, for testing small quantities, only 3 cc of solution being necessary, range 1.000 to 1.060 specific gravity..... 2.50
30556. **Hydrometer, Vinegar**, showing percentage of acetic acid..... .75
30560. " **(Solidimeter)**, for solids in vinegar, with thermometer..... 3.00





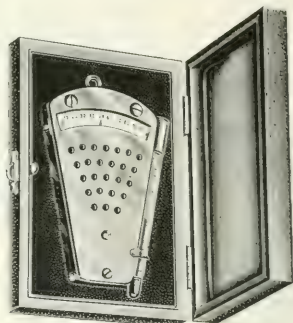
No. 30561



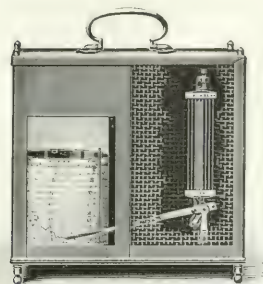
No. 30568



No. 30572



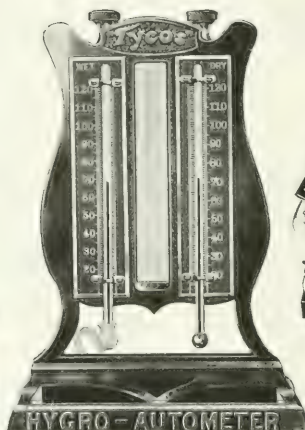
No. 30576



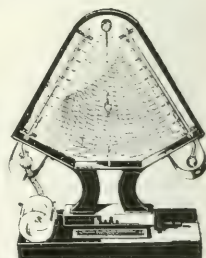
No. 30592



No. 30580

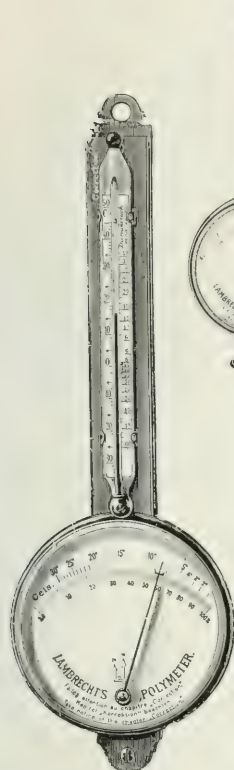


No. 30581



No. 30588

30564.	Hygrometer, Mason, wet and dry bulb, for the determination of relative and absolute humidity and dew point in connection with the tables and directions. With black oxidized brass scale on oak board 5 x 11 inches.	2.25
30568.	Hygrometer, simple form, in nickel plated case, with scale 80 mm in diameter.	2.75
30572.	“ in brass case, with scale reading in degrees and percentage.	6.00
30576.	“ Wurster's model, for industrial use. For the testing of the moisture content of yarn, cloths, bales of tobacco, paper, etc. With thermometer.	10.00
30580.	Hygrometer (Sling Psychrometer), for obtaining more rapid results than are possible with a stationary wet and dry bulb instrument. Scale 0° to 100° F. in $\frac{1}{2}$ °. With copper protecting case.	9.00
30584.	Hygrometer (Hygro-Autometer), an improved form of wet and dry bulb hygrometer, reading directly in percentage of relative humidity and dew point without the aid of tables. On black japanned iron frame.	10.50
30588.	Hygrometer (Hygrodeik), an improved wet and dry bulb instrument showing relative and absolute humidity, with dew point without reference to tables. With black, japanned iron frame.	12.00
30592.	Hygrometer, Registering (Hydrograph), latest model. For registering the relative humidity. As used by manufacturers of food products, paper, explosives, etc., and in cold storage and tobacco warehouses. Including charts for one year's use.	
	Duty Free.	45.00
	Stock.	55.00
30593.	Extra Charts, per box of 53 sheets.	2.00
30594.	Extra Pens, each.	1.50
30595.	Special Ink, per bottle.	.50



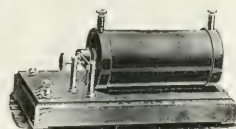
No. 30596



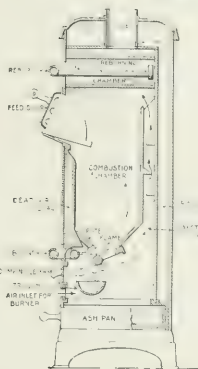
No. 30600



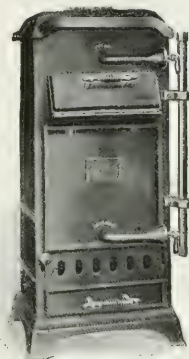
No. 30604



No. 30612

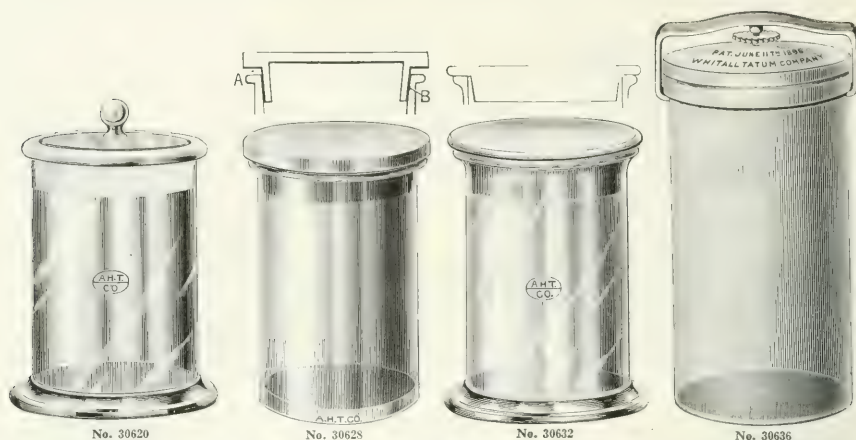


No. 30608—Sectional view



No. 30608

30596. **Hygrometer, Lambrecht's Polymeter**; an accurate hygrometer with thermometer and various correction scales, used both in meteorology and for industrial purposes; non-corrodible, with phosphor-bronze finish with enamel scale, total height 245 mm, diameter of scale 75 mm; not to be confused with cheaper forms of the same instrument. 12.00
30600. **Hygrometer, Miniature Form**, total height 140 mm with scale 75 mm in diameter, in non-corroding phosphor-bronze case, with thermometer; particularly recommended for laboratory use as in bacteriological incubators, etc. 14.00
30604. **Hygrometer, Lambrecht**, for factory use, for hanging on wall, without thermometer, in nickel plated zinc case, total height 150 mm, with scale 75 mm in diameter. 5.00
30608. **Incinerator, Laboratory**, for convenient disposition of laboratory and dissecting room refuse, particularly infected animal carcasses and similar material. The arrangement of the combustion chamber and burner insures the drying of wet compact refuse by allowing air passage through it until it is finally consumed. Any drip or liquid matter is caught in the trough below the burner. The apparatus is economical in its operation and because of asbestos lining causes very little heat radiation in the room and it is easy to take apart. Full directions for installation and operation are sent with each machine. A  $\frac{1}{4}$  inch gas supply pipe is necessary and a proper flue for disposing of the products of combustion. Size I is supplied with a single grate and Size II has two grates.
- |   | Size I       | Size II      |
|---|--------------|--------------|
| Designation.....                                | 15 x 11 x 37 | 18 x 18 x 49 |
| Outside dimensions, inches.....                 | 1412.5       | 2825         |
| Capacity of combustion chamber, cu. inches..... | 60.00        | 90.00        |
- Each.....
30612. **Induction Coils, Ruhmkorff**, mounted on polished mahogany base, with condenser and adjustable vibrator.
- |   | $\frac{1}{4}$ | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{3}{4}$ | 1     |
|---|---------------|---------------|---------------|---------------|-------|
| Length of spark, approximately, inches..... | 4.50          | 6.75          | 9.00          | 13.50         | 18.00 |
- Each.....
30616. **Ink, Diamond**, for writing on glass, 25 grams in gutta percha bottle. Per bottle..... 50



30620. Jar, Museum, A. H. T. Co. Special, with foot and ground in, air tight stopper with knob. A widely used jar for all laboratory and museum purposes, of special finish affording a great brilliancy and lustre and not to be confused with jars of similar shape to be had at much less price. See list below of additional sizes to be had on import orders.

Height, cm.....	10	10	13	15	15	15	15	18	18	20	25	60
Diam., cm.....	7.5	10	7.5	10	15	20	30	12	15	30	25	15

Each.....50 .80 .60 1.00 1.80 3.00 6.80 1.30 2.00 7.55 6.00 8.00

30620. Jars, Museum, A. H. T. Co. Special Import List. For the convenience of those preparing lists of our Special Museum Jars as listed above for duty free importation we list the sizes available with prices, duty free, f. o. b. Philadelphia boxing extra. Orders are intended to be for at least 10 jars of a size (except in the case of very large sizes) and to aggregate at least \$50.00 in value.

Height, cm.....	5	5	5	5	5	6	6	6	6	6	6	6
Diameter, cm.....	1	2	3	4	5	1	2	3	5	6	8	8

Duty Free, per 10... .75 .75 .75 .95 .95 .75 .75 .75 1.05 1.15 1.80

Height, cm.....7 7 7 7 8 8 8 8 8 8 8 8

Diameter, cm.....2 3 4 10 2 3 4 5 6.5 8 10

Duty Free, per 10... .75 .95 1.15 2.40 1.05 1.15 1.35 1.35 1.50 1.90 2.70

Height, cm.....8 9 9 9 9 9 9 9 10 10 10 10

Diameter, cm.....16 2 3 4 5 6 9 2 3 4 5

Duty Free, per 10... 6.00 1.15 1.15 1.35 1.35 1.50 2.70 1.15 1.35 1.50 1.50

Height, cm.....10 10 10 10 10 12 12 12 12 12 12 12

Diameter, cm.....6 7.5 10 12 15 2 3 4 5 6 8

Duty Free, per 10... 1.70 1.90 3.00 4.50 5.55 1.15 1.35 1.50 1.70 1.90 2.40

Height, cm.....12 12 12 12 12 13 13 13 13 15 15 15

Diameter, mm.....10 12 15 18 20 5 7.5 10 16 2 3

Duty Free, per 10... 3.75 4.65 6.00 7.50 9.75 1.70 2.25 3.75 7.50 1.50 1.70

Height, cm.....15 15 15 15 15 15 15 15 15 18 13

Diameter, cm.....4 5 8 10 12 15 20 25 30 2 8

Duty Free, per 10... 1.70 1.90 2.65 3.75 4.95 6.60 11.25 15.00 26.35 1.70 1.70

Height, cm.....18 18 18 18 18 18 18 18 18 18 18

Diameter, cm.....4 5 6 7 9 10 11 12 15 18 24

Duty Free, per 10... 1.90 2.05 2.25 2.25 3.75 4.50 4.50 4.80 7.50 9.30 15.00

Height, cm.....20 20 20 20 20 20 20 20 20 20 20

Diameter, cm.....4 5 6 7 8 10 12 14 16 20 25

Duty Free, per 10... 1.90 2.25 2.45 2.65 2.85 4.80 5.55 6.75 9.00 12.00 18.75

Height, cm.....20 22 22 22 22 22 22 22 22 22 22

Diameter, cm.....30 2 4 5 7 8 9 10.5 12 14 16

Duty Free, per 10... 37.60 2.25 2.25 2.45 2.85 3.30 4.05 4.95 5.55 6.90 9.00

Height, cm.....22 25 25 25 25 25 25 25 25 25 25

Diameter, cm.....22 3 5 8 10 12 16 18 20 25 30

Duty Free, per 10... 15.00 2.85 3.20 4.50 5.70 6.60 9.60 11.25 15.00 22.50 34.10

Height, cm.....25 30 30 30 30 30 30 30 30 35 35

Diameter, cm.....33 5 8 10 12 15 20 25 30 5 8

Duty Free, per 10... 56.00 3.90 5.90 6.85 7.75 11.65 19.40 29.15 45.75 5.80 7.20

Height, cm.....35 35 35 35 40 40 45 45 50 50 55

Diameter, cm.....12 15 20 25 10 15 12 20 10 25 10

Duty Free, per 10... 11.05 15.40 26.25 38.50 10.85 18.40 15.40 30.65 13.15 66.50 14.90

30628.

Jars, Museum, Hopkins-Columbia Model, as furnished by us in large quantities to various laboratories in Johns Hopkins University and Columbia University. The stopper of the jar is ground inside but the lid remains some distance from the upper flange. Glass and workmanship identical with No. 30620. These jars are not regularly carried in stock.

Height, cm.....

9

10

12

13

15

18

20

Diameter, cm.....

4

5

6

7.5

8

14

6

Duty Free, per 10.....

1.30

1.50

1.80

2.25

2.60

6.65

2.40

Height, cm.....

20

22

22

24

30

35

35

Diameter, cm.....

10

9

20

14.5

15

9.5

30

Duty Free, per 10.....

4.70

4.00

12.50

7.35

11.60

7.70

75.00

30632.

Jar, Museum, of same quality and finish as No. 30620 but with flat lid with air tight grinding between the lid and top of jar and with the downward projection of the lid loosely fitting into the jar, thus preventing the sticking of the lid sometimes encountered when the ground surface is inside the jar. The flat lid permits stacking of the jar either when filled or empty.

Height, cm.....

10

10

13

15

15

15

18

20

25

60

Diam., cm.....

7.5

10

7.5

10

15

20

30

12

15

30

25

15

Each.....

.50

.80

.60

1.00

1.80

3.00

6.80

1.30

2.00

7.55

6.00

8.00

30636.

Jar, Standard Museum, Whittall-Tatum Co., with mouth same size as body; with rubber band and metal clamp and two glass suspension rings on under side of glass cover. By special arrangement with the manufacturers we offer these Jars at original factory prices.

Height, inches.....

4

6

8

12

18

8

12

18

8

Diameter, inches.....

2 $\frac{1}{4}$

2 $\frac{1}{4}$

2 $\frac{1}{4}$

2 $\frac{1}{4}$

3 $\frac{1}{2}$

3 $\frac{1}{2}$

3 $\frac{1}{2}$

3 $\frac{1}{2}$

3 $\frac{1}{2}$

5

5

Capacity, pints.....

2

4

1

1 $\frac{1}{2}$

2 $\frac{1}{2}$

4

2

4

6

5 $\frac{1}{2}$

Each.....

.38

.41

.43

.49

.54

.57

.62

.73

.86

1.08

Per dozen.....

3.65

4.05

4.32

4.73

5.40

5.67

6.08

7.16

8.51

10.94

Height, inches.....

12

15

18

8

12

6

8

12

15

18

Diameter, inches.....

5

5

5

6 $\frac{1}{2}$

6 $\frac{1}{2}$

7 $\frac{1}{2}$

7 $\frac{1}{2}$

7 $\frac{1}{2}$

7 $\frac{1}{2}$

7 $\frac{1}{2}$

Capacity, pints.....

8

10

12

8

12

9

12

18

22

28

Each.....

1.30

1.38

1.49

1.40

1.57

2.03

2.16

2.46

2.70

2.89

Per dozen.....

12.96

13.77

14.85

14.04

15.66

20.25

21.60

24.57

27.00

28.89

Height, inches.....

24

36

12

18

24

Diameter, inches.....

7 $\frac{1}{2}$

7 $\frac{1}{2}$

11 $\frac{1}{2}$

11 $\frac{1}{2}$

11 $\frac{1}{2}$

Capacity, pints.....

36

56

38

58

80

Each.....

3.32

4.32

5.13

6.48

8.10

Per dozen.....

33.21

43.20

51.30

64.80

81.00

Fittings for No. 30636 Jars.

Diameter, inches.....

2 $\frac{1}{4}$

3 $\frac{1}{2}$

5

6 $\frac{1}{2}$

7 $\frac{1}{2}$

11 $\frac{1}{2}$

30640.

Lids, only, each.....

.06

.10

.20

.28

.50

1.30

30644.

Clamps, only, each.....

.24

.30

.48

.54

.90

1.70

30648.

Rubbers, only, each.....

.05

.15

.35

.40

.60

1.40

30652.

Jars, Museum, A. H. T. Co. Special Flat Top, with gound on lids of plate glass and with foot. The great variety of sizes offered and low prices have resulted in a very wide use of these jars. The foreign method of manufacture produces a jar of much finer appearance and finish and less susceptible to sudden temperature changes than corresponding ware made in the U. S. See following import list for duty free prices and variety of sizes available on importation order.

Height, cm.....

10

10

10

15

15

15

15

18

Diameter, cm.....

6

10

16

10

15

20

30

15

Each.....

.35

.60

1.10

.75

1.05

1.90

4.00

1.20

Height, cm.....

18

20

20

25

60

70

70

Diameter, cm.....

21

18

30

25

15

10

15

Each.....

2.30

1.75

6.00

3.70

4.35

3.00

4.95

30652.

Jars, Museum, A. H. T. Co. Special Flat Top, Import List. For the convenience of those ordering Jars No. 30652 for duty free importation we give the following list of sizes available and duty free prices.

Height, cm.....

5

5

5

6

6

6

7

7

8

8

8

Diameter, cm.....

1.5

2

3

2

3

4

1.5

5

2.5

3.5

5

Duty Free, per 10...

.55

.55

.60

.60

.65

.75

.60

.90

.70

.80

.95

Height, cm.....

8

8

8

8

8

9

9

9

9

10

10

Diameter, cm.....

8

10

12

13

15

4

6

9

18

2

4

Duty Free per 10 ..

1.45

1.95

2.40

2.80

3.35

.90

1.20

1.85

5.30

.75

.90

Height, cm.....

10

10

10

10

10

11

11

12

12

12

12

Diameter, cm.....

5

6

8

10

16

3

9

2

3

4

5

Duty Free per 10 ..

1.15

1.15

1.65

2.15

4.00

.85

2.05

.75

.90

1.00

1.15

Height, cm.....

12

12

12

12

12

13

13

13

13

13

13

Diameter, cm.....

8

10

12

16

20

3

5

6

7.5

10

13

Duty Free per 10 ..

1.85

2.55

2.80

4.45

6.55

.95

1.30

1.55

2.05

2.55

3.35

Height, cm.....

13

13

13

14

14

14

14

15

15

15

15

Diameter, cm.....

15

18

28

10

14

20

25

2

4

5

6

Duty Free per 10 ..

3.90

5.70

14.00

2.70

3.65

6.80

10.30

1.00

1.05

1.30

1.55

Height, cm.....

15

15

15

15

15

15

16

16

16

16

18

Diameter, cm.....

8

10

12

15

20

30

10

15

16

20

3

Duty Free per 10 ..

2.05

2.75

3.15

3.90

6.95

15.40

2.80

3.90

4.55

6.95

1.15

Height, cm.....

18

18

18

18

18

18

18

18

18

20

20

Diameter, cm.....

4

5

8

10

12

15

18

21

25

2.5

4

Duty Free per 10 ..

1.25

1.55

2.25

3.10

3.75

4.45

6.40

8.35

11.80

1.20

1.20





No. 30632-56

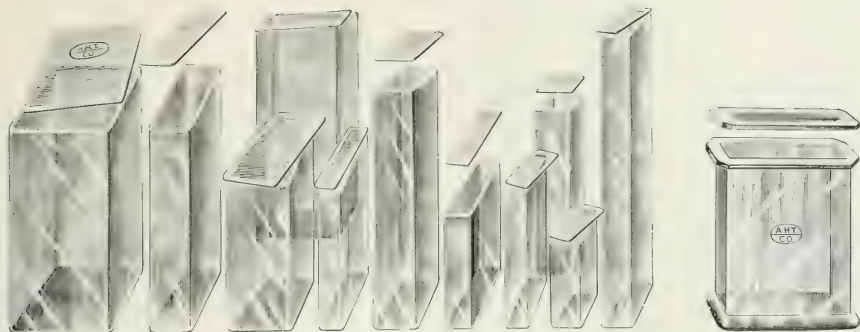
30632. (Cont.)

Height, cm.....	20	20	20	20	20	20	20	20	20	20	20
Diameter, cm.....	5	6	7	8	10	12	13	14	15	16	18
Duty Free per 10...	1.55	1.75	2.00	2.25	3.10	3.75	4.05	4.50	4.95	5.75	6.40
Height, cm.....	20	20	20	22	22	22	23	23	23	25	25
Diameter, cm.....	20	30	35	5	7	9	6	12	18	3	4
Duty Free per 10...	8.05	23.10	42.50	1.70	2.20	2.60	2.10	4.20	7.50	1.40	1.80
Height, cm.....	25	25	25	25	25	25	25	25	25	25	25
Diameter, cm.....	5	6	7	10	12	15	16.5	18	20	25	30
Duty Free per 10...	2.05	2.10	2.40	3.80	4.65	5.90	7.30	7.85	9.90	13.65	24.65
Height, cm.....	28	28	28	28	28	28	28	28	28	30	30
Diameter, cm.....	4	5	6	7	8	10	12	16	20	3.5	5
Duty Free per 10...	1.70	2.15	2.60	2.90	2.90	4.75	5.60	7.85	11.15	1.70	2.15
Height, cm.....	30	30	30	30	30	30	30	30	30	30	30
Diameter, cm.....	6	8	9	10	11	12	14	15	16	20	25
Duty Free per 10...	2.60	3.25	4.35	5.10	5.60	6.10	6.95	7.50	8.65	11.90	18.20
Height, cm.....	30	35	35	35	35	35	35	35	35	35	35
Diameter, cm.....	30	3	4	5	6	7	8	10	12	15	18
Duty Free per 10...	31.10	2.10	2.70	2.90	3.35	3.75	4.00	5.75	7.75	10.25	12.85
Height, cm.....	35	35	35	40	40	40	40	40	40	40	40
Diameter, cm.....	20	25	30	4	5	6.5	8	10	15	20	25
Duty Free per 10...	15.50	29.75	42.00	2.80	3.10	3.95	5.05	6.45	12.50	18.40	38.60
Height, cm.....	40	45	45	45	45	45	45	50	50	50	50
Diameter, cm.....	30	5	8	10	15	20	25	5	6	8	10
Duty Free per 10...	52.50	3.35	5.05	6.45	13.75	22.25	40.25	4.50	4.55	6.45	8.70
Height, cm.....	50	50	50	55	55	55	55	55	60	60	60
Diameter, cm.....	12	15	20	6	8	10	12	15	7.5	10	12
Duty Free per 10...	10.90	15.50	24.00	5.75	7.65	10.65	14.25	17.25	8.35	11.85	13.20
Height, cm.....	60	60	70	70	70	70	70	80	80	80	80
Diameter, cm.....	15	20	7.5	10	12	15	20	8	10	12	15
Duty Free per 10...	19.00	27.50	11.15	13.10	14.40	21.65	32.75	13.95	16.40	18.60	25.15
Height, cm.....	80	90	90	90	90	90	95	95	100	100	100
Diameter, cm.....	20	8	10	12	15	10	12	8	10	15	
Duty Free per 10...	38.00	18.15	20.60	23.00	32.30	22.90	27.35	22.55	27.25	45.25	

30660. Jars, Rectangular Museum, A. H. T. Co. Special, with flat ground on lids for permanent sealing. Of heavy clear white glass of extra fine finish and annealing. Much superior to jars of similar appearance which are sold at lower prices. Plain finish only in stock. See also following import list for duty free prices.

Height, cm.....	10	10	12	13	15	16	20	20	20
Width, cm.....	5	6	8	10.5	10.5	12	6	10.5	15
Depth, cm.....	2.5	5	5	4	5	9	4	5	7
Each.....	.40	.55	.60	.70	.80	1.10	.75	1.20	1.75
Height, cm.....	21	26	26	29	30	37	42	45	46
Width, cm.....	21	65	15	21	15	20	25	10.5	12
Depth, cm.....	10	5	8	16	4	18	14	7.5	9
Each.....	2.85	1.15	2.30	4.00	2.00	4.35	5.00	3.20	3.30

30660. Jars, Rectangular Museum, A. H. T. Co. Special, Import List. For the convenience of those ordering Jars No. 30660 for duty free importation we give a list of the sizes available and duty free prices. These are furnished in two styles of finish, i. e., A plain, and B, with one wide face ground and polished.



No. 30660-61

No. 30668

30660. (Cont.)

Height, cm.....	10	10	12	12	13	13	14	14	14	15	15
Width, cm.....	5	6	8	9	10.5	13	9	10	14	8	9
Depth, cm.....	2.5	5	5	3	4	5	2.5	2	3	4	7.5
<b>A, Duty Free, per 10</b>	<b>1.50</b>	<b>1.90</b>	<b>2.20</b>	<b>2.20</b>	<b>2.50</b>	<b>3.80</b>	<b>2.35</b>	<b>2.55</b>	<b>3.80</b>	<b>2.65</b>	<b>2.959</b>
<b>B " " "</b>	<b>2.30</b>	<b>2.55</b>	<b>3.65</b>	<b>3.80</b>	<b>4.00</b>	<b>6.75</b>	<b>4.00</b>	<b>4.20</b>	<b>6.95</b>	<b>4.40</b>	<b>4.555</b>
Height, cm.....	15	15	15	15	16	17	18	18	18	18	18
Width, cm.....	10.5	14	15	30	12	20	8	12	12	14	18
Depth, cm.....	5	6	6	10	9	7	4	2	6	12	7
<b>A, Duty Free, per 10</b>	<b>2.95</b>	<b>3.80</b>	<b>4.20</b>	<b>13.90</b>	<b>4.00</b>	<b>9.70</b>	<b>3.10</b>	<b>4.00</b>	<b>4.20</b>	<b>6.75</b>	<b>7.60</b>
<b>B " " "</b>	<b>4.55</b>	<b>7.15</b>	<b>7.60</b>	<b>22.90</b>	<b>7.60</b>	<b>15.75</b>	<b>5.25</b>	<b>6.95</b>	<b>7.15</b>	<b>10.50</b>	<b>11.80</b>
Height, cm.....	18	18	20	20	20	20	20	20	20	20	20
Width, cm.....	22	40	6	10	10.5	12	12	13	13	15	15
Depth, cm.....	3	14	4	7	5	5.5	10	5	7	7	10
<b>A, Duty Free, per 10</b>	<b>10.30</b>	<b>30.00</b>	<b>2.80</b>	<b>4.45</b>	<b>4.45</b>	<b>5.05</b>	<b>4.45</b>	<b>4.45</b>	<b>4.45</b>	<b>6.30</b>	<b>6.95</b>
<b>B " " "</b>	<b>16.80</b>	<b>52.50</b>	<b>4.45</b>	<b>6.75</b>	<b>6.65</b>	<b>7.15</b>	<b>8.40</b>	<b>7.35</b>	<b>7.35</b>	<b>10.50</b>	<b>10.95</b>
Height, cm.....	20	20	20	20	20	21	21	22	22	24	24
Width, cm.....	17	17	19	42	50	10	21	7	10	11	15
Depth, cm.....	9	14	7	7.5	15	7	10	3	3	5	7
<b>A, Duty Free, per 10</b>	<b>7.80</b>	<b>9.25</b>	<b>7.75</b>	<b>36.00</b>	<b>58.75</b>	<b>4.45</b>	<b>10.50</b>	<b>4.20</b>	<b>4.45</b>	<b>4.85</b>	<b>6.30</b>
<b>B " " "</b>	<b>13.65</b>	<b>15.15</b>	<b>14.95</b>	<b>50.00</b>	<b>90.00</b>	<b>6.65</b>	<b>17.65</b>	<b>6.30</b>	<b>6.65</b>	<b>7.15</b>	<b>10.50</b>
Height, cm.....	24	25	25	26	26	26	26	26	26	26	26
Width, cm.....	24	10	20	6.5	15	15	18	21	21	21	26
Depth, cm.....	14	8	7	5	8	10	15	8	10	16	13
<b>A, Duty Free per 10.</b>	<b>13.45</b>	<b>5.70</b>	<b>10.50</b>	<b>4.40</b>	<b>8.80</b>	<b>9.25</b>	<b>14.75</b>	<b>12.35</b>	<b>13.20</b>	<b>15.40</b>	<b>17.60</b>
<b>B, " " "</b>	<b>19.55</b>	<b>8.65</b>	<b>17.65</b>	<b>6.40</b>	<b>13.00</b>	<b>13.45</b>	<b>20.50</b>	<b>21.15</b>	<b>22.00</b>	<b>26.95</b>	<b>30.80</b>
Height, cm.....	28	28	28	29	29	30	30	30	30	30	30
Width, cm.....	10	19	20	9	15	10	10	17	19	20	23
Depth, cm.....	6	7	7.5	7	4	6	10	9	6.5	18	5
<b>A, Duty Free per 10.</b>	<b>5.95</b>	<b>11.00</b>	<b>12.35</b>	<b>5.95</b>	<b>7.70</b>	<b>5.95</b>	<b>6.85</b>	<b>9.50</b>	<b>11.45</b>	<b>16.75</b>	<b>14.10</b>
<b>B, " " "</b>	<b>9.25</b>	<b>19.80</b>	<b>21.15</b>	<b>9.25</b>	<b>11.55</b>	<b>9.90</b>	<b>12.10</b>	<b>17.60</b>	<b>20.70</b>	<b>23.80</b>	<b>22.90</b>
Height, cm.....	30	30	31	33	34	35	35	36	37	37	40
Width, cm.....	24	25	29	16	28	15	20	12	12	25	30
Depth, cm.....	7.5	6	11	10	18	13	10	9	4	14	25
<b>A, Duty Free per 10.</b>	<b>16.10</b>	<b>16.10</b>	<b>22.00</b>	<b>11.50</b>	<b>28.00</b>	<b>16.50</b>	<b>19.25</b>	<b>10.00</b>	<b>9.50</b>	<b>22.00</b>	<b>39.50</b>
<b>B, " " "</b>	<b>25.30</b>	<b>25.30</b>	<b>39.50</b>	<b>21.25</b>	<b>49.25</b>	<b>27.75</b>	<b>33.00</b>	<b>15.00</b>	<b>14.50</b>	<b>40.00</b>	
Height, cm.....	40	42	45	45	45	46	47	50	50	50	50
Width, cm.....	40	10.5	10	12	25	25	12	12	20	25	30
Depth, cm.....	25	7.5	7	9	15	16	9	10	15	12	30
<b>A, Duty Free per 10.</b>	<b>71.25</b>	<b>14.00</b>	<b>14.00</b>	<b>14.50</b>	<b>24.75</b>	<b>26.25</b>	<b>14.50</b>	<b>16.00</b>	<b>49.25</b>	<b>57.50</b>	<b>75.00</b>
<b>B, " " "</b>		<b>19.80</b>	<b>20.00</b>	<b>21.00</b>	<b>55.00</b>	<b>57.50</b>	<b>21.00</b>	<b>23.00</b>	<b>85.00</b>	<b>103.75</b>	
Height, cm.....						57	60	60	65	65	85
Width, cm.....						12	15	16	16	30	16
Depth, cm.....						4	15	13	11	20	12
<b>A, Duty Free per 10.</b>						<b>17.50</b>	<b>36.25</b>	<b>36.25</b>	<b>37.50</b>	<b>80.00</b>	<b>92.50</b>
<b>B, " " "</b>						<b>27.50</b>	<b>67.50</b>	<b>67.50</b>	<b>75.00</b>		

30668. Jars, Rectangular Museum, of same quality and shapes as No. 30660 excepting that they are furnished with glass foot and ground flange or lip at the top, providing a broader support at base and a widened space for air tight sealing. Not carried in stock.

Height, cm.....	6.5	11	12	13	20	21	25	27	35	40	45
Width, cm.....	5.5	3.5	8	12	16	21	25	26	13	21	13
Depth, cm.....	5	1	2	4	4.5	10	12	13	12	17	12
<b>Duty Free per 10...</b>	<b>4.50</b>	<b>3.60</b>	<b>3.60</b>	<b>6.00</b>	<b>18.45</b>	<b>21.75</b>	<b>27.30</b>	<b>30.00</b>	<b>27.00</b>	<b>40.50</b>	<b>31.50</b>





No. 30700



No. 30701

30700.	Jars, Specimen, with foot, slightly constricted neck and ground in stopper. Highly finished.						
	Height, mm.....	80	100	120	150	180	200
	Diameter, mm.....	30	30	40	50	60	80
	Each.....	.25	.35	.35	.50	.55	.75
30704.	Jars, Uniform Specimen, with foot, slightly constricted neck and ground in stopper. These jars are all of the same height i. e., 145 mm, but of varying capacities and are widely used in chemical museums.						
	Capacity, cc.....	5	10	20	50	100	125
	Each.....	.25	.25	.25	.30	.40	.50



No. 30708



No. 30712



No. 30716



No. 30720



No. 30724



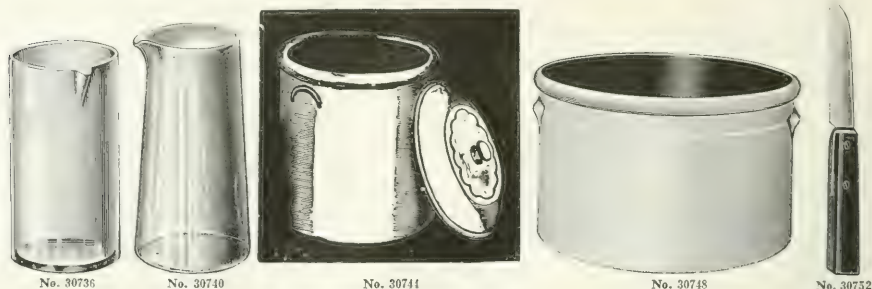
No. 30728



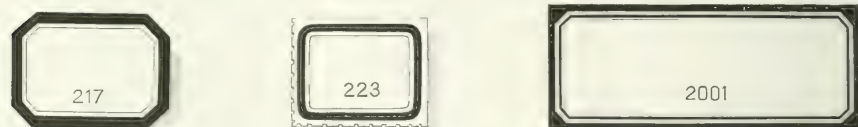
No. 30732

30708.	Jars, Inverted Specimen, of clear white glass, with carefully ground in, air tight stopper.						
	Height, cm.....			13	19	22	32
	Diameter, cm.....			5	8	10	12
	Each.....			.40	.90	1.10	1.80
30712.	Jars, Inverted Specimen, for cork stopper.						
	Height, cm.....	9.5	11	15	19.5	23	35.5
	Diameter, cm.....	4	5	6.5	7	9	11
	Each.....	.10	.13	.15	.20	.30	.50
30716.	Jars, "Lightning," of greenish glass. Lid is clamped air-tight by spring clip.						
	Capacity.....			$\frac{1}{2}$ pt.	1 pt.	$\frac{1}{4}$ pt.	1 qt.
	Each.....			.12	.14	.15	.16
	Per gross.....			9.00	10.00	11.00	12.00
30720.	Jars, "Safety Valve," of white glass. Improved spring clamp with rubber washer makes the jars absolutely air-tight.						
	Capacity.....			$\frac{1}{2}$ pt.	1 pt.	1 $\frac{1}{2}$ pt.	1 qt.
	Each.....			.14	.16	.18	.20
	Per gross.....			10.75	12.60	14.00	15.50
30724.	Jars, Specimen, of white glass. So-called "Jam Jars" with cover held air tight by rubber band and spring clamp.						
	Height, mm.....	40	70	80	100	150	120
	Diameter, mm.....	40	65	75	75	70	100
	Capacity, cc.....	30	125	200	250	400	600
	Each.....	.07	.09	.10	.11	.14	.23
30728.	Jars, Specimen, with metallic screw cap.						
	Height, mm.....		60	95	120	110	145
	Diameter, mm.....		30	35	45	60	80
	Capacity, cc.....		30	60	120	250	500
	Per dozen.....		.80	.90	1.25	1.83	3.00
30732.	Jars, Preparation, so-called "Ointment Pots." Of flint glass with metal screw caps lined with paraffine paper to protect the metal from corrosive action of contents.						
	Capacity, ounces.....	$\frac{1}{2}$	1	2	3	4	8
	Each.....	.05	.06	.08	.10	.12	.14
	Per gross.....	4.50	5.45	6.95	8.85	10.50	12.40

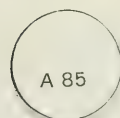




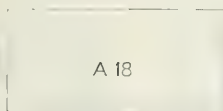
No. 30736		No. 30740		No. 30744		No. 30748		No. 30752	
30736.	Jars, Precipitating, straight cylindrical form, with spout.								
	Capacity, cc.....	125	250	500	1000	2000	4000	6000	10000
	Each.....	.20	.30	.40	.60	.80	1.50	2.00	3.00
30740.	Jars Precipitating, conical or tapering form, with spout.								
	Capacity.....	Soz.	16oz.	32oz.	1 gal.	2gal.	3gal.		
	Each.....	.20	.30	.55	.70	1.25	2.90	4.00	
30744.	Jars, Stoneware, with two handles and cover, resistant to chemicals and useful in laboratories as waste jars and similar purposes. Can be furnished on special order up to 50 gallons capacity. Because of their low value in comparison to their bulk, boxing is charged extra at cost.								
	Capacity, gallons.....	1	2	4	5	6	8	12	
	Height, inches.....	7½	9	11½	12½	14½	16½	18½	
	Diameter, inches.....	7½	8½	12	12½	12½	13½	15½	
	Each.....	.40	.60	1.00	1.25	1.50	1.75	2.50	
30748.	Jars, Stoneware, low form. The sizes listed are frequently used for temporary preservation of specimens in comparative anatomy. They can also be furnished on special order up to 50 gallons capacity. With covers. Boxing charged extra at cost.								
	Capacity, gallons.....				4	6	10	15	
	Height, inches.....				8½	10	12½	14½	
	Diameter, inches.....				13	15	17½	19½	
	Each.....				1.00	1.25	2.25	4.00	
30752.	Knife, a convenient laboratory knife for preparing potato cultures, paring corks, etc.....								.20



No. 30756		No. 30760		No. 30768	
30756.	Labels, Dennison, gummed, on white paper with red border.				
	Number.....	225	223	217	213
	Size, inches.....	¾ x 1½	¾ x 1½	1½ x 1½	1½ x 1½
	Number in box.....	175	150	125	100
	Per box.....	.06	.06	.06	.06
	Per carton of 1 doz. boxes.....	.50	.50	.50	.50
30760.	Labels, Dennison, gummed, in books, white with red border and rounded corners, in sheets, perforated, bound in book form. Size of book 9 x 5 inches, with 25 sheets in book.				
	Number.....	225	223	217	213
	Size, inches.....	¾ x 1½	¾ x 1½	1½ x 1½	1½ x 1½
	Number in book.....	1575	1400	1050	750
	Per book.....	.25	.25	.25	.25
	Carton of 6 books.....	1.25	1.25	1.25	1.25
30764.	Labels, Dennison, gummed, perforated, in rolls. Each roll is contained in a special box with slot opening so that labels can be drawn out as needed without opening the box. Each roll contains 1000 labels. Number.....				
	Size, inches.....	¾ x 1½	¾ x 1½	1½ x 1½	1½ x 1½
	Per roll.....	.45	.50	.65	.70
30768.	Labels, Dennison, gummed, white with red border, large rectangular shape. Packed 100 in a box. Number.....				
	Size, inches.....	2¼ x 1½	2½ x 1½	3½ x 1½	4 x 1½
	Per box.....	.12	.15	.18	.20
	Per carton of 10 boxes.....	1.00	1.25	1.25	1.50



No. 30772



No. 30776



No. 30781



No. 30788



No. 30792



No. 30796



No. 30800



No. 30804



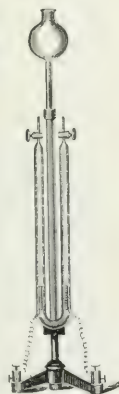
No. 30816



No. 30820

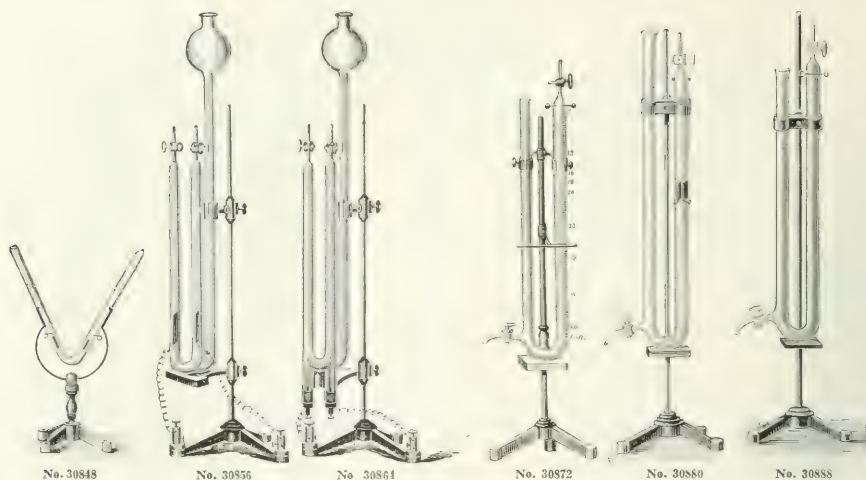


No. 30824



No. 30840

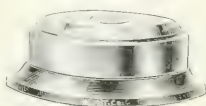
30772.	Labels, Dennison, gummed, on plain white paper without border. Circular.				
	Number.....	A81	A83	A84	A85
	Diameter, inches.....	1 1/2	2	3	4
	Per box of 1000.....	.10	.15	.15	.15
30776.	Labels, Dennison, gummed, on plain white paper without border. Rectangular. No. A18, size 1 1/2 x 2 1/2 inches. Per box of 1000.....				.20
30780.	Label Book, containing the names and formulae of the most used chemicals and reagents. Printed on good paper, gummed and perforated and bound in book form. Per book.....				.40
30784.	Ladles, of wrought iron, with lip, 4 inches in diameter.....				.50
30788.	Lamps, Alcohol, of polished brass, with screw top and metal cap.				
	Capacity, ounces.....		2	4	8
	Each.....		.50	.60	.75
30792.	Lamp, Alcohol, of brass, with wick; capacity 8 ounces.....				.20
30796.	" " of glass, with base and ground on glass cap. With wick and metal fitting.				
	Capacity, cc.....		60	100	150
	Each.....		.40	.45	.50
30800.	Lamps, Alcohol, cylindrical shape, of glass with cap ground on. With wick and metal fitting.		30	60	100
	Capacity, cc.....		.35	.40	.45
30804.	Lamps, Alcohol, cylindrical shape, of glass with cap ground on, and with side tubulation and glass stopper. With wick and metal fitting.			60	100
	Capacity, cc.....			.55	.60
	Each.....			.65	.75
30808.	Lamp Wicking, a wick of any size is obtained by using the required number of strands. Per bundle.....				.05
30812.	Lead Shot, for cleaning bottles, No. 6. Per lb.....				.10
LECTURE APPARATUS AS DESCRIBED BY HOFFMAN in his "Introduction to Modern Chemistry." The more frequently required pieces only are listed but the complete set is quoted for importation upon application.					
30816.	Apparatus for the Decomposition of Water, with sliding, graduated glass tubes for the collection of gases. With platinum electrodes.....				2.25
30820.	Apparatus, same as No. 30816 but on glass foot.....				2.75
30824.	Apparatus for the Decomposition of Water, with graduated glass tubes with ground in stoppers. With platinum electrodes.....				3.50
30828.	Apparatus, same as No. 30824 but on glass foot.....				3.75
30832.	Apparatus for Decomposition of Water, with plain tubes with stopcocks, platinum electrodes, support and binding screws.....				10.00
30836.	Glass Parts only for No. 30832, with platinum electrodes.....				6.00
30840.	Apparatus for the Decomposition of Water, similar to No. 30832 but with graduated tubes, on support.....				11.00
30844.	Glass Parts only for No. 30840, with platinum electrodes.....				7.00



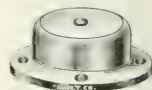
30848. Apparatus for the Decomposition of Hydrochloric Acid, Water and Ammonia, with platinum electrodes and support..... 6.00
30852. Glass Parts only for No. 30848, with platinum electrodes..... 3.00
30856. Apparatus for the Decomposition of Water, Hydrochloric Acid and Ammonia, with two platinum electrodes and glass stopcocks, on support with binding screws..... 10.00
30860. Glass Parts only for No. 30856, with platinum electrodes..... 6.00
30864. Apparatus, same as No. 30856 but with carbon electrodes..... 10.00
30868. Glass Parts only for No. 30864, with carbon electrodes..... 6.00
- Note—The complete outfit for the decomposition of water, hydrochloric acid and ammonia consists of two No. 30864 connected with one No. 30856.
30872. Lecture Eudiometer, with platinum electrodes, two stopcocks, one graduated arm and support.. 10.00
30876. Glass Parts only for No. 30872, with platinum electrodes..... 7.00
30880. Apparatus for the Decomposition and Recomposition of Water, with platinum electrodes in middle of tube, two glass stopcocks and support..... 10.00
30884. Glass Parts only for No. 30880 with platinum electrodes..... 7.00
30888. Apparatus for Demonstrating that Three Volumes of Hydrogen Combined with One Volume of Nitrogen to Form Two Volumes of Ammonia. With platinum electrodes, two glass stopcocks and support..... 8.00
30892. Glass Parts only for No. 30888, with platinum electrodes..... 5.00



No. 30900

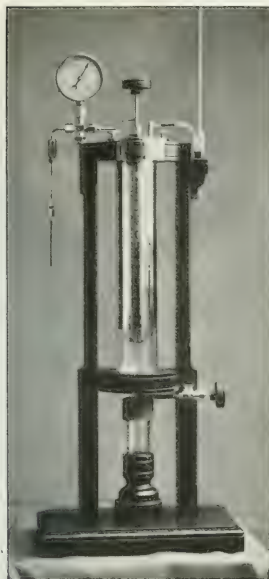


No. 30904

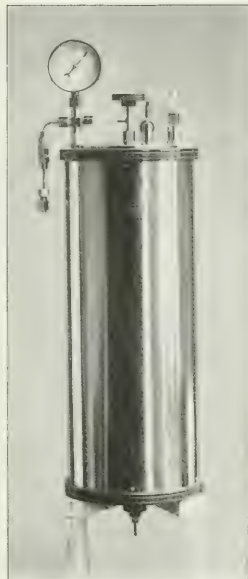


No. 30908

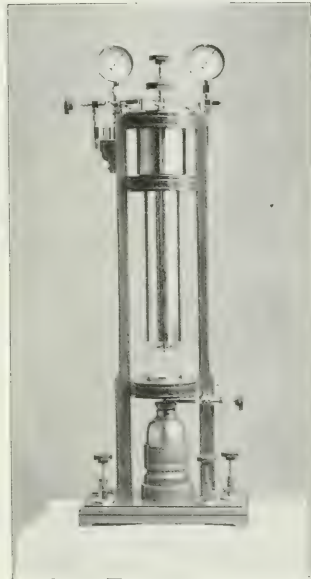
30896. Lens Paper, Japanese, for cleaning lenses, does not easily collect dust or become greasy and harsh. It is very soft and free from impurities.
- | Size of sheet mm.              | 185 x 275 | 275 x 275 |
|--------------------------------|-----------|-----------|
| Per package of 100 sheets..... | .35       | .65       |
30900. Level, of brass, 4 inches long..... 50
30904. " round, in brass case; for balances, bacteriological work, etc.; 30 mm diameter..... 2.00
30908. " " " nickel plated; 15 mm diameter..... .65
30912. Liquid Air Apparatus, Olszewski, Demonstration Model. Arranged for the liquefaction of air only. Simple model for lecture table work with a capacity of 100 cc of liquid air in 5 or 10 minutes when operated with cylinders of 13 liter capacity under compression of 150 to 200 atmospheres pressure. With two 13 liter Steel Cylinders. See illustration on following page.
- | Duty Free..... | 175.00 | Duty Paid..... | 245.00 |
|----------------|--------|----------------|--------|
|----------------|--------|----------------|--------|
30916. Liquid Air Apparatus, Olszewski, Technical Model. With apparatus entirely enclosed in nickel plated jacket. Capacity 1 liter of liquid air per hour when used in connection with a 7 h. p. Whitehead Compressor. Without Compressor.
- | Duty Free..... | 287.50 | Duty Paid..... | 402.50 |
|----------------|--------|----------------|--------|
|----------------|--------|----------------|--------|



No. 30912

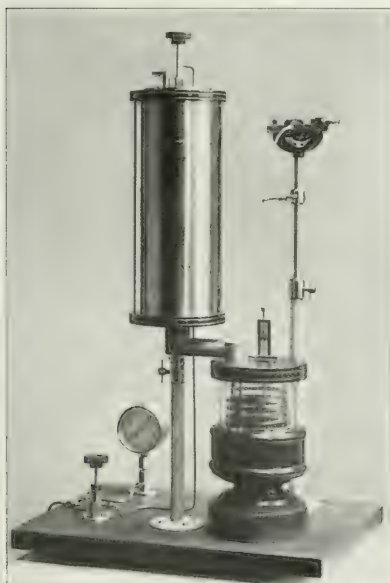


No. 30916



No. 30920

References:—K. Olszewski, "Verflüssigung des Wasserstoffs bei Vermeidung von Kälte-Verlusten," Zeitschrift für komprimierte und flüssige Gase sowie für die Pressluft-Industrie (XIV, Jahrgang).  
K. Olszewski, "Die Verflüssigung der Gase," Bulletin des Sciences de Cracovie, Maiheft 1903, Sitzung vom 4. Mai.



No. 30924

**30920. Liquid Air Apparatus, Olszewski, Universal Type.**

For hydrogen and other gases, latest improved model, capacity 1.2 liters of liquid air per hour when operated with a Whitehead Compressor of 7 h. p. Capacity of hydrogen 1 liter per hour with the same sized Compressor. Without Compressor.

Duty Free.... 575.00 Duty Paid... 805.00

**30924. Thermostat for Low Temperatures, Olszewski, range from 0 to  $-190^{\circ}$  C. For use with liquid air or other liquified gas as cooling media.**

Duty Free... 325.00 Duty Paid... 455.00

**30928. Compressor, High Pressure, Whitehead, suitable for both air and hydrogen but not for work with oxygen, requires 7 h. p. for attaining a final pressure of 200 kilograms per cubic centimeter; to be operated at 350 r. p. m. and with a loose pulley for power driving. Drawing with dimensions and other details upon application As furnished by us to the Palmer Physical Laboratory, Princeton University. Price with direct connecting electric motor on request.**

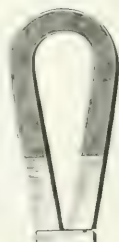
Duty Free... 885.00 Duty Paid... 1062.00

Note—Reprints in German descriptive of the above apparatus on application.





No. 30932



No. 30936



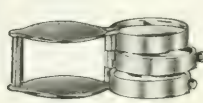
No. 30941



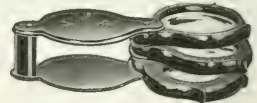
No. 30961



No. 30952



No. 30972



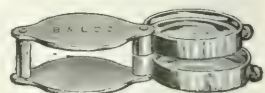
No. 30960



No. 30948



No. 30956



No. 30968

30932.	Magnets, Bar, of steel, best quality. Length, mm.....	100	125	150	200	250
	Each.....	.25	.30	.35	.50	.75
30936.	Magnets, Horseshoe, with armature. Length, mm.....	50	75	100	125	150
	Each.....	.08	.10	.15	.25	.50
30940.	Matrasses, of hard Bohemian glass, for blowpiping.....					.10
30944.	Magnifiers, Pocket, Oval Shape, Single Lens. Mounted in best quality vulcanized rubber, durable, light weight and of neat appearance.					
	Number.....	50	56	52	68	74
	Lens Diam. in Inches.....	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$
	Power.....	$5 \times$	$4 \times$	$3.5 \times$	$3 \times$	$2.5 \times$
	Each.....	.35	.45	.55	.70	.85
30948.	Magnifiers, Pocket, Oval Shape, Double Lens. Otherwise same as above.					1.00
	Number.....	51	57	63	69	75
	Lens Diam. in Inches.....	$\frac{3}{8}, \frac{3}{4}$	$\frac{3}{4}, 1$	$1\frac{1}{4}, 1\frac{1}{2}$	$1\frac{1}{2}, 1\frac{3}{4}$	$1\frac{3}{4}, 2$
	Range of Powers.....	5 to 12 $\times$	4 to 9 $\times$	3.5 to 8 $\times$	2.5 to 5 $\times$	2 to 4 $\times$
	Each.....	.50	.70	.85	1.00	1.35
30952.	Magnifiers, Pocket, Bellows Shape, Single Lens. Otherwise same as above.					
	Number.....				101	110
	Lens Diam. in Inches.....				$\frac{3}{4}$	$\frac{7}{8}$
	Power.....				$7 \times$	$4 \times$
	Each.....				.35	.40
30956.	Magnifiers, Pocket, Bellows Shape, Double Lens. Otherwise same as above.					
	Number.....				102	111
	Lens Diam. in Inches.....				$\frac{3}{8}, \frac{3}{4}$	$\frac{3}{4}, \frac{7}{8}$
	Range of Powers.....				7 to 15 $\times$	4 to 9 $\times$
	Each.....				.50	.60
30960.	Magnifiers, Pocket, Bellows Shape, Triple Lens. Otherwise same as above.					
	Number.....				103	112
	Lens Diam. in Inches.....				$\frac{1}{2}, \frac{3}{4}, \frac{3}{4}$	$\frac{3}{4}, \frac{7}{8}, \frac{1}{2}$
	Range of Powers.....				7 to 30 $\times$	4 to 20 $\times$
	Each.....				.70	.85
30964.	Magnifiers, Pocket, Nickel Mounted, Single Lens. Differ from preceding in mounting which is of metal. Simply constructed and attractively nickel-plated. Furnished only in bellows shape. Lenses of same quality and range as those in vulcanite mounting.					
	Number.....				101 NK	110 NK
	Lens Diam. in Inches.....				$\frac{3}{4}$	$\frac{7}{8}$
	Power.....				$7 \times$	$5 \times$
	Each.....				.50	.55
30968.	Magnifiers, Pocket, Nickel Mounted, Double Lens. Otherwise same as above.					
	Number.....				102 NK	111 NK
	Lens Diam. in Inches.....				$\frac{3}{4}, \frac{3}{4}$	1, 1
	Range of Powers.....				5 to 12 $\times$	4 to 9 $\times$
	Each.....				.70	.85
30972.	Magnifiers, Pocket, Nickel Mounted, Triple Lens. Otherwise same as above.					
	Number.....				103 NK	112 NK
	Lens Diam. in Inches.....				$\frac{1}{2}, \frac{3}{4}, \frac{3}{4}$	1, 1, 1
	Range of Powers.....				4 to 20 $\times$	3.5 to 17 $\times$
	Each.....				1.00	1.20

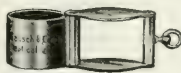
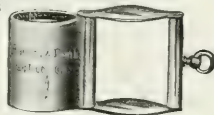

Nos. 1, 2, 3  
No. 30976

No. 6  
No. 30976

No. 7, 7a  
No. 30976

Nos. 168a, 167a,  
166a, 165a  
No. 30984

Nos. 168, 167, 166, 165  
No. 30984

Nos. 173a, 172, 171a  
No. 30988

Nos. 173, 172, 171, 170  
No. 30988

No. 30980  
Nos. 163, 162, 161, 160

No. 30980  
Nos. 163a, 162a, 161a, 160

**30976. Magnifiers, Doublet.** Good lenses at a very moderate cost. Consist of two separated, plano convex lenses. Nos. 1, 2 and 3 are mounted for dissecting microscopes, No. 6 is a hand magnifier with hexagonal handle and No. 7 and 7a have folding pocket cases.

Number.....	1	2	3	6	7	7a
Focus in Inches.....	$1\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Power.....	$7\times$	$10\times$	$14\times$	$14\times$	$14\times$	$12\times$
Each.....	.75	.75	.75	.75	1.00	1.00

**30980. Magnifiers, Coddington.** Give a good definition and a wide field. Composed of a cylinder of glass with a deep groove cut in at equal distance from ends to serve as a diaphragm; ends of cylinder ground spherically and polished to form lens surfaces. Nos. 163a, 162a, 161a, 160a are mounted for use in dissecting microscopes, and Nos. 163, 162, 161, 160 in folding pocket cases.

Number.....	163a	162a	161a	160a	163	162	161	160
Focus in Inches.....	$1\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{4}$
Power.....	$7\times$	$10\times$	$14\times$	$20\times$	$7\times$	$10\times$	$14\times$	$20\times$
Each.....	1.25	1.25	1.25	1.25	1.50	1.50	1.50	1.50

**30984. Magnifiers, Triple Aplanats.** High grade magnifier with large field and perfect correction for chromatic aberration as well as flatness, astigmatism and distortion; new construction designed for highest grade work. Composed of two meniscus lenses of flint glass separated by double convex lens of crown glass. Nos. 168a, 167a, 166a, 165a are mounted for use in dissecting microscopes and Nos. 168, 167, 166, 165 in folding pocket cases.

Number.....	168a	167a	166a	165a	168	167	166	165
Focus in Inches.....	$1\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{4}$
Power.....	$7.5\times$	$10\times$	$15\times$	$20\times$	$7.5\times$	$10\times$	$15\times$	$20\times$
Each.....	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

**30988. Magnifiers, Hastings Aplanatic Triplet.** With a very large angle of view and corrections of a high order. Nos. 173a, 172a and 171a are mounted for use in dissecting microscopes and Nos. 173, 172, 171 and 170 in folding pocket cases.

Number.....	173a	172a	171a	173	172	171	170
Focus in Inches.....	$1\frac{1}{2}$	1	$\frac{3}{4}$	$1\frac{1}{2}$	1	$\frac{3}{4}$	$\frac{3}{4}$
Power.....	$7.5\times$	$10\times$	$14\times$	$7\times$	$10\times$	$14\times$	$20\times$
Each.....	7.50	7.50	7.50	7.50	7.50	7.50	7.50



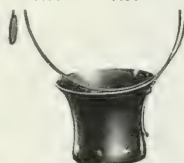
No. 30992



No. 30996 141A



No. 30996 144-2



No. 30996 141LP



No. 31000

**30992. Magnifier, Tripod.** Used for elementary biological work and dissections. Lens mounting screws up and down in brass frame for focusing. Diameter of lens one inch, power  $7.5\times$ ..... .35

**30996. Magnifier, Watchmaker's.** Easily held in orbit of the eye; No. 141LP has detachable spring to pass around the head. Lenses furnished in two different diameters (sizes 2 and 3), with same eye opening in each case. No. 144A fitted with two lenses, one removable to give two different magnifying powers as indicated below.

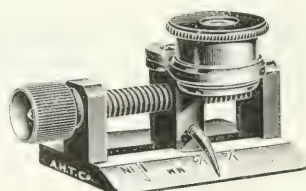
Number.....	144-2	144-3	144 $\frac{1}{2}$	144-2 LP	144-3 LP	144A
Lens Diam. in Inches.....	1	$1\frac{1}{2}$	$1\frac{1}{2}$	1	$1\frac{1}{2}$	2.1
Range of Power.....	$2\text{ to }10\times$	$2\text{ to }5\times$	$10\times$	$2\text{ to }5\times$	$2\text{ to }5\times$	$4\text{ to }10\times$
Each.....	.40	.40	.40	.55	.55	.60

**31000. Magnifiers, Engravers' Glass.** Designed for engravers, carvers and die cutters, also available for biological work, retouching and use as condensers because of their large clear field. Nos. 146-148 made with two plano-convex lenses giving flatter field and better image than one lens. All styles in vulcanized mountings.

Number.....	146	148	146A	148A
Lens Diam. in Inches.....	$1\frac{1}{4}$	$2\frac{1}{4}$	$1\frac{1}{4}$	$2\frac{1}{4}$
Power.....	$3.5\times$	$2.5\times$	$3.5\times$	$2.5\times$
Each.....	1.50	2.50	.75	1.25



No. 31001



No. 31008



No. 31012

- 31004. Magnifiers, Linen Testers.** Intended primarily for counting threads in cloth, but used for beginners' classes and various other magnifying purposes. Mounting hinge to fold up compactly when not in use. Number..... 141 141½ 142 143 143½  
 Openings in Inches..... 1 x 1 ½ x ½ ½ x ½ ½ x ½ ½ x ½  
 Power..... 7 10 x 10 x 10 x 10 x  
 Each..... 2.00 .45 .45 .45 .45
- 31008. Magnifier, Cloth Counting Glass,** with base divided into spaces of ½, ½ and 1 inch and the space between the ½ and 1 inch marks divided into 10 mm. With focusing eyepiece with pointer attached which traverses the whole scale by means of quick acting screws. In leather covered case... 7.50
- 31012. Magnifiers, Reading Glasses.** Regularly furnished with nickel rim of sufficient width to protect lens surfaces and with handle of ebonized wood.  
 Lens Diam. Inches..... 2 2½ 3 3½ 4 4½ 5 5½ 6  
 Focus in Inches..... 5 6 7 8 10 12 13 14 15  
 Each..... .60 .80 1.00 1.50 2.00 2.25 2.50 3.00 3.50



No. 31016



No. 31020



No. 31024



No. 31028 and 36



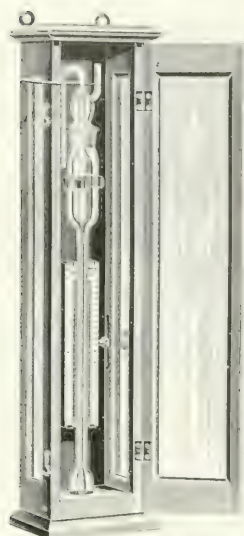
No. 31032

**MAGNIFIERS, ZEISS ANASTIGMATIC COMBINATION LENSES FOR DISSECTING, ETC.** These excellent combinations are to be recommended particularly because of a comparatively large field of view, excellent definition and remarkably long working distance, and are furnished in simple mount for use in a dissecting microscope, handle and lens ring, or small tripods, as well as in single and double folding pocket cases. The Brücke system is designed especially for dissecting with the Mayer Dissecting Microscope and the systems may be used separately as simple magnifiers or with the ocular for greater magnification. To secure the best results with all simple magnifiers the observer should place the eye as near as possible to the magnifier.

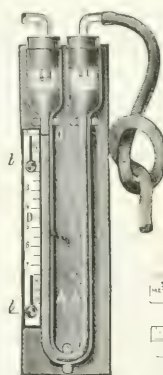
- 31016. Dissecting Combination Lens, Brücke,** giving powers of 11, 17, 30, 40, 60 and 100 diameters with the different combinations used singly or with the ocular lens.  
 Duty Free 10.00 Stock 12.40
- 31020. Dissecting Combination Lens, Brücke large,** with lens of a free aperture of 25 mm, power 5 to 10 diameters, with working distance from 60 to 70 mm and covering field from 7 to 13 mm in diameter..... 8.75 10.85
- 31024. Magnifiers, Anastigmatic,** in simple mount, for use on dissecting stands or in lens ring with handle, small tripods, etc.  
 Magnification..... 16 x 20 x 27 x  
 Diameter of field of view, mm..... 10 8 6  
 Free working distance, mm..... 9 7 5.5  
 Duty Free..... 5.50 5.50 5.50  
 Stock..... 6.82 6.82 6.82
- 31028. Magnifiers, Anastigmatic,** same as above but in single folding mount.  
 Magnification..... 16 x 20 x 27 x  
 Duty Free..... 6.25 6.25 6.25  
 Stock..... 7.75 7.75 7.75
- 31032. Magnifiers, Anastigmatic,** same as above but in double folding mount.  
 Magnification..... 10 x and 20 x 16 x and 27 x 20 x and 27 x  
 Duty Free..... 10.50 12.00 12.00  
 Stock..... 13.02 14.88 14.88
- 31036. Plankton Magnifier, Kolkwitz,** a special magnifier of 40 diameters, very useful in field work, giving a field of view 2 mm in diameter with a free working distance of 3 mm. This magnifier has a numerical aperture of 0.27. See R. Kolkwitz, "Entnahme- und Beobachtungsinstrumente für biologische Wasseruntersuchungen." Mitteilung aus der königlichen Prüfungsanstalt für Wasserversorgung zu Berlin, 1907, Heft 9, 126 and 127. pp.  
 Duty Free..... 12.00 Stock..... 14.88



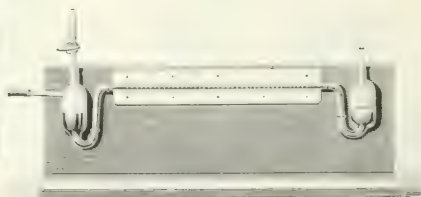




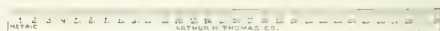
No. 31084



No. 31088



No. 31092



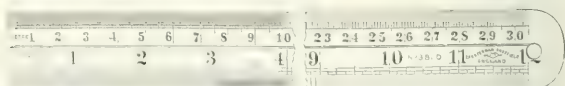
No. 31096



No. 31100



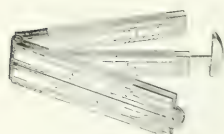
No. 31100



No. 31104



No. 31124



No. 31120



No. 31128



No. 31132

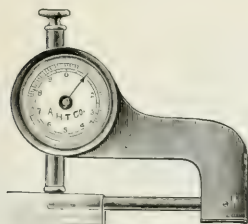


No. 31136

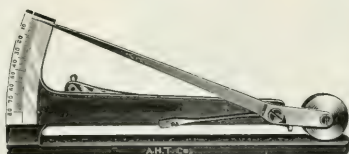
31084. Manometer, Differential, König. For measurements up to 20 mm of water pressure. With bottle of standard phenol solution. See *Lunge, Chemisch-technische Untersuchungs-methoden, 5. Aufl., p. 189* or *Chemiker-Zeitung 1889, p. 71*. In polished case with glass door. .... 18.00
31088. Gauge, Seger Draft. See *Lunges Sodaindustrie*. Very sensitive, for measuring the difference of drafts in flues, etc. With bottle of phenol solution. .... 8.00
31092. Manometer, for measuring very slight differences in pressure, as in the determination of the specific rate of gases, etc. See *Zeitschr. für phys. und chem. Unterricht 1905, p. 199*. .... 6.00

# MEASURING APPLIANCES

31096. Rule, Boxwood, graduated on one side in millimeters to 30 centimeters, on the other in  $\frac{1}{4}$ th inches to 12 inches. .... .20
31100. Rule, Celluloid, 6 inches long, in both metric and English, with comparative Centigrade and Fahrenheit thermometer scales on the back. A convenient vest pocket rule for the laboratory work. .... .05
31104. Rule, Steel, with English and metric scales graduated on one side to  $\frac{1}{16}$ th millimeter and  $\frac{1}{16}$ ,  $\frac{1}{32}$ , and  $\frac{1}{64}$ th inches; and on the other to  $\frac{1}{10}$ ,  $\frac{1}{20}$ ,  $\frac{1}{40}$ ,  $\frac{1}{80}$ ,  $\frac{1}{160}$ ,  $\frac{1}{320}$ , and  $\frac{1}{640}$  inches. Length 6 inches (150 mm). .... .75
31108. Meter Stick, with brass bound ends, graduated in metric system on one side and in inches on the other. .... .50
31112. Meter Stick, as above, plain, i. e. without brass bound tips. .... .25
31116. Half Meter Stick, exactly the same as above but only  $\frac{1}{2}$  meter long, with metal tips. .... .30
31120. Rule, folding caliper, of boxwood, graduated on one side in millimeters and on the other in  $\frac{1}{4}$ th inches. Length (unfolded) inches. .... 6 12
- Each. .... .30
31124. Rule, Decimeter, Steel, one decimeter long, one centimeter wide, one millimeter thick and graduated in centimeters and millimeters. Volume is 1 cc and weight in grams is the specific gravity. In metal bound leather pocket case. .... .25
31128. Caliper Rule, pocket form, of polished brass, with both English and metric scale up to 6 centimeters and 2 $\frac{1}{2}$  inches. Very convenient in laboratory work. .... .50
31132. Micrometer Caliper, nickel plated, graduated to  $\frac{1}{100}$ th millimeter. Sizes given are the maximum opening between jaws. Scale, from 0 to, mm. .... 10 15 20
- Each. .... 1.75 2.00 2.25
31136. Micrometer Caliper, B. & S. American Standard, 1 inch reading to  $\frac{1}{1000}$ th of an inch. .... 5.00
31140. " " same as No. 31136 but reading to  $\frac{1}{1000}$ th of a millimeter. .... 5.00



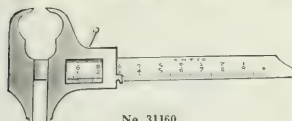
No. 31144



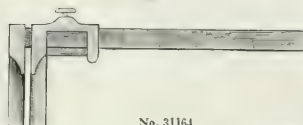
No. 31148



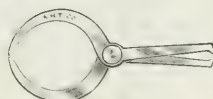
No. 31152



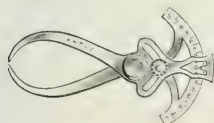
No. 31160



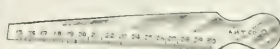
No. 31164



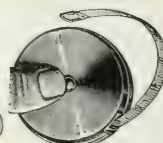
No. 31168



No. 31172



No. 31176

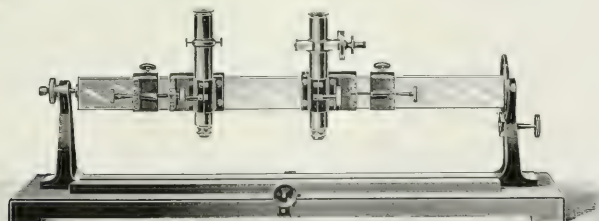


No. 31180



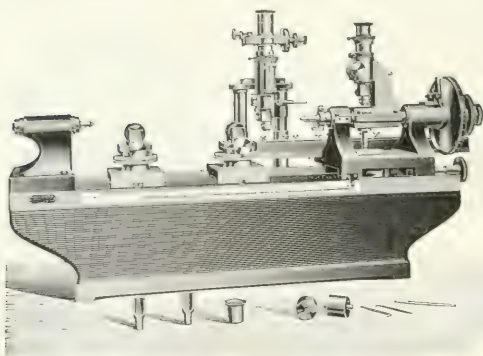
No. 31184

31144. **Micrometer Caliper**, for measuring the thickness of tubing walls to  $\frac{1}{10}$  mm. Particularly convenient in measuring glass or metal tubing rapidly and with accuracy. Range from  $\frac{1}{16}$  to 10 mm. 5.00
31148. **Micrometer Caliper**, roller form, for ascertaining the thickness of sheets of rubber, cloth, paper, etc. Reading in  $\frac{1}{100}$ ths of an inch up to  $\frac{3}{16}$ ths of an inch. 20.00
31152. **Micrometer Caliper**, dial form with steel box, reading on the dial to  $\frac{1}{16}$ th mm; very convenient for measurement of cover glasses in the laboratory, diameter of small wires, etc., in both laboratory and shop practice. 12.00
31156. **Micrometer Caliper**, as above, but reading to  $\frac{1}{1000}$ th of an inch. 15.00
31160. **Vernier Caliper**, for both inside and outside measuring. Of steel, graduated in millimeters to 10 centimeters, with vernier reading to  $\frac{1}{10}$ th millimeter. 1.50
31164. **Vernier Caliper**, of steel, graduated in millimeters and inches. 20 centimeters long, with vernier reading to  $\frac{1}{10}$ th millimeters. 2.00
31168. **Caliper**, plain, of steel, for inside and outside measurements. .60
31172. " with graduated measuring arc, reading in millimeters to 80 mm and in  $\frac{1}{16}$ th inches to 3 inches 1.75
31176. **Measuring Cones**, of steel, nickel plated, for measuring holes, graduated to  $\frac{1}{16}$ th millimeter.
- |            |         |          |
|------------|---------|----------|
| Scale, mm. | 1 to 15 | 15 to 30 |
| Each.      | 1.00    | 1.50     |
31180. **Tape Measure**, Linen, with English and metric graduations. In nickel plated case with spring.
- |                       |     |     |
|-----------------------|-----|-----|
| Total length, meters. | 1   | 2   |
| Each.                 | .25 | .40 |
31184. **Tape Measure**, Steel, with metric divisions on one side and English on the other. In German silver case with spring. Very convenient in laboratory work. Total length, meters...
- |       |          |
|-------|----------|
| 1     | 2        |
| Each. | .75 1.00 |

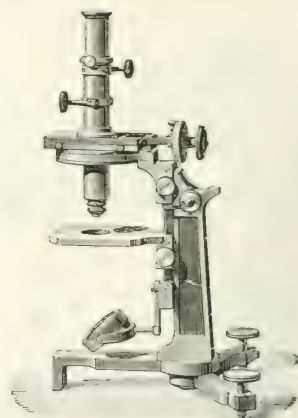


No. 31188

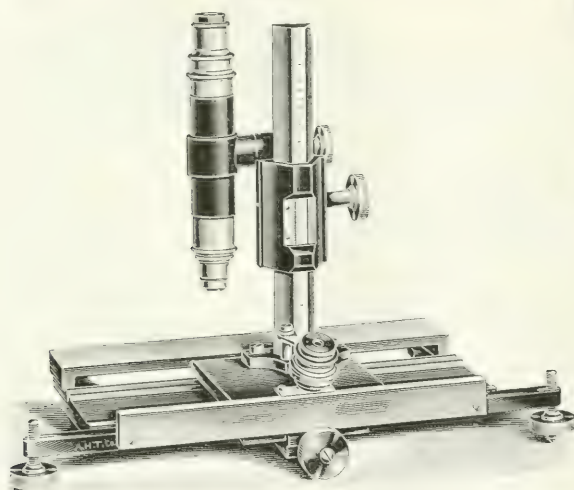
31188. **Micrometer Microscope**, a measuring device for use in calibrating or verifying thermometer scales etc., or as a comparator. With two microscopes mounted on horizontal carrier, each with micrometer fine adjustment and one with Fraunhofer ocular micrometer. Reading by means of Fraunhofer micrometer to  $\frac{1}{100}$  millimeter.
- |            |       |            |        |
|------------|-------|------------|--------|
| Duty Free. | 84.00 | Duty Paid. | 105.00 |
|------------|-------|------------|--------|



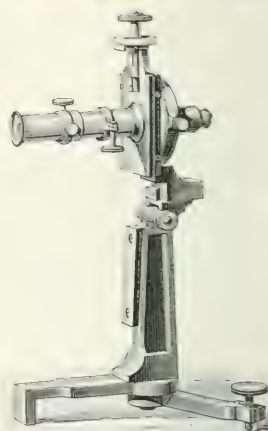
No. 31192



No. 31196a

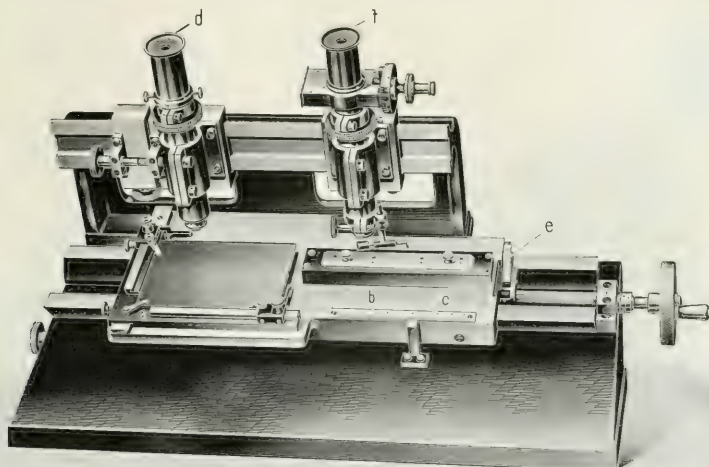


No. 31200



No. 31196b

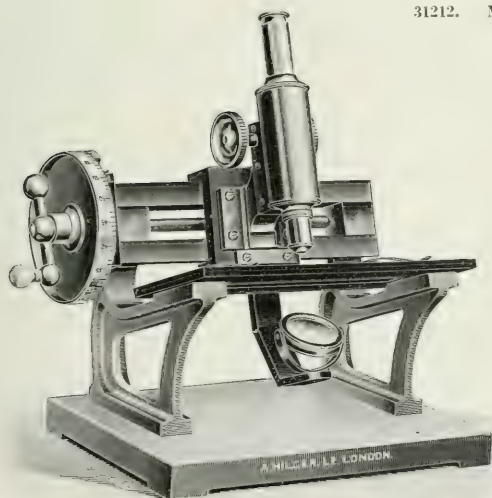
31192. **Micrometer Measuring Machine**, Model of 1910, for actual as well as comparative measurements, reading by comparison to an accuracy of  $\frac{1}{1000}$ th of a millimeter and giving absolute value measurements to  $\frac{1}{1000}$ th of a millimeter; total length which may be measured 300 mm, with centering device. This instrument is of great value in shop and laboratory practice where great accuracy is desired. Larger models measuring up to 2 meters quoted on application.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 480.00 | Duty Paid..... | 600.00 |
|----------------|--------|----------------|--------|
31196. **Micrometer Microscope, Fraunhofer**, measuring a total length of 20 mm and reading to  $\frac{1}{1000}$ th of a millimeter. Mounted on tripod with axis so that same may be used vertically (Fig. a) or horizontally (Fig. b). The tripod is folding and the whole is mounted in a neat wooden case.
- |                |       |                |        |
|----------------|-------|----------------|--------|
| Duty Free..... | 84.00 | Duty Paid..... | 105.00 |
|----------------|-------|----------------|--------|
31200. **Microscope, Measuring**, with vertical and horizontal scale on silver reading to  $\frac{1}{1000}$ th millimeter. The vertical and horizontal scales are 16 cm long and are both actuated by rack and pinion. The microscope rotates in a vertical plane and may be clamped in any position. The horizontal and vertical positions of the microscope are definitely marked. A glass micrometer scale is placed in the common focus of the eyepiece and objective and serves to measure very short distances without moving either slide. By substituting a telescope objective the instrument may be used as a reading telescope or as a short range cathetometer. With one ocular, a 2 inch micro objective and extra telescope objective.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 54.00 | Duty Paid..... | 68.40 |
|----------------|-------|----------------|-------|
31204. **Extra Micrometer Eyepiece** for above, reading to  $\frac{1}{1000}$ th of a millimeter.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 25.50 | Duty Paid..... | 32.30 |
|----------------|-------|----------------|-------|



No. 31208

31208. **Micrometer Microscope, or Comparator**, for the most accurate measurement of spectrographic negatives and other measurements of great accuracy. The separation of two spectral lines, for instance, is measured by direct comparison to a small scale on the speculum metal, the coefficient of expansion of which is equal to that of the plate itself; reading by means of Fraunhofer micrometer in the ocular to  $\frac{1}{1000}$  millimeter, which diminishes the error of the thread  $\frac{1}{10}$ . Particularly recommended for rapid measurements as the screw carrying the stage or table is immediately disengaged and its position changed.

For measuring over, cm.....	9 x 12	13 x 18
Duty Free.....	321.60	480.00
Duty Paid.....	402.00	600.00



No. 31212

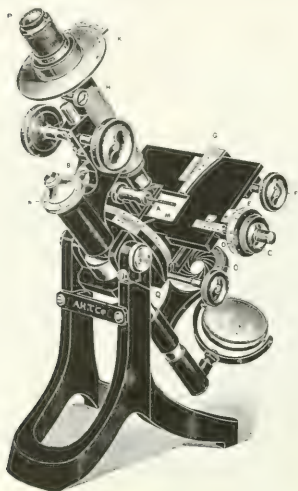
31212. **Micrometer Microscope, Hilger, 1913 Model** embodying the following modifications—

The mirror moves with the travelling microscope.  
The milled head for turning the screw has been replaced by a handle.  
The standards which support the slide and substage are so designed that the axis of the microscope is sloped towards the observer.  
A vernier has been added, reading to 0.001 mm.

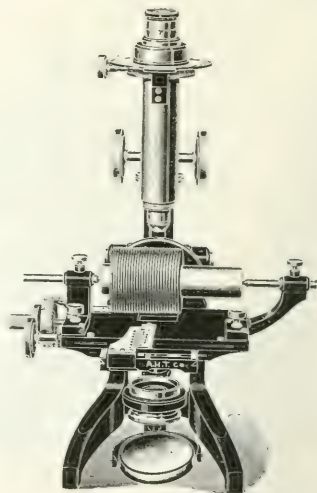
Though specially designed for rapid and accurate measurements of spectrum photographs, this instrument can be used with equal advantage for any of the accurate length measurements needed in a laboratory. With the aid of the handle now provided, one can pass rapidly over the whole range of motion, while at the same time the large drum-head enables measurements to be taken to 0.001 mm. The base is of cast iron and the microscope slide is mounted on two cast iron standards of such shape as to form convenient handles for moving the instrument.

Length of horizontal motion, inches	3	6
Duty Free.....	164.70	197.10
Duty Paid.....	225.70	270.10





No. 31216



No. 31216

**MICROSCOPE, MEASURING AND SCREW TESTING, LARGE MODEL.** This instrument has been designed to give absolute measurements of small objects to a very fine degree with extreme accuracy. It is particularly useful for measuring and checking such articles as micrometer screws, divided scales, standard gauges, dies, etc., and is constructed for great ease of manipulation in such work. It is designed to give the length and pitch of a screw to .001 mm, the maximum, minimum and effective diameters and depth of thread to .01 mm, and the angle of the thread to 5' without the necessity of moving the screw after it has been once set up for examination.

The object, according to its shape, is either held in one of the chucks, A, of the rotating, divided holder, B, or fixed on the stage and its length measured by moving it across the field of the webbed ocular, P, by means of a micrometer screw with a divided head, C. The pitch of this screw is .5 mm and the head is divided into 100 parts; the fractions of these divisions are read from a vernier to  $\frac{1}{1000}$  mm or  $\frac{1}{2500}$  inch. Entire millimeters are shown by an index on the scale, D. The plate of the stage is held against the flint hard point of the screw by two long spiral springs set in the same plane as the dove-tailed fittings, one on each side equally displaced. The point of the screw is turned on a separate piece of steel to the thread; it is hardened, ground and polished, and let into the main piece before the thread is cut. This is done to prevent distortion of the thread which would occur if the hardening were done after cutting. The screw, which is of the most accurate description, is cut between dead centres with a single point.

The width of an object is measured by moving it across the field by means of the milled head, F; the amount of the traverse is read to .01 mm by the scale and vernier, G.

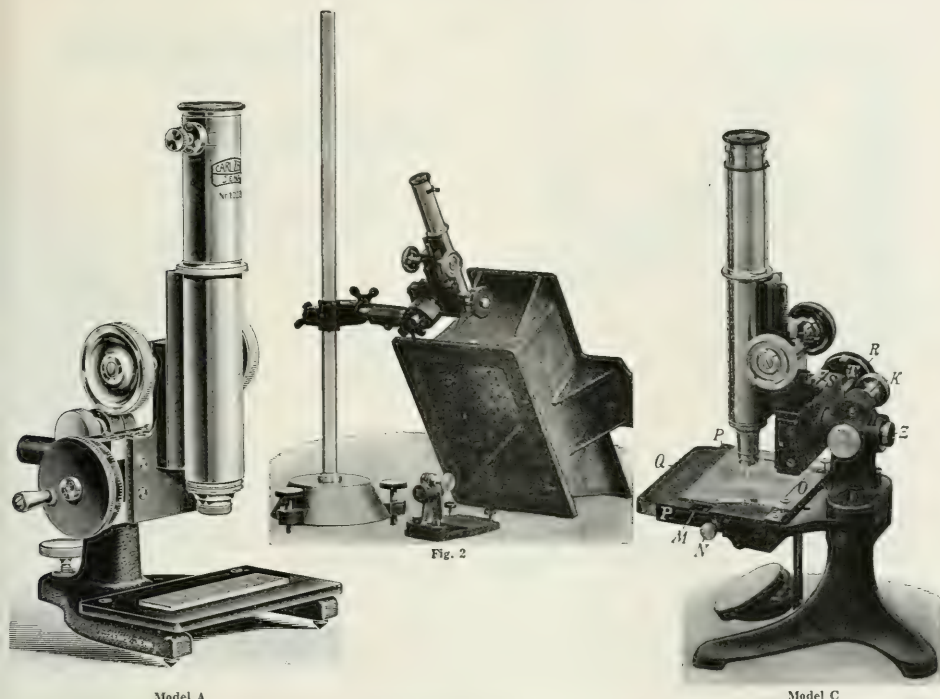
The angle between two lines, edges, sides, etc., as, for example, the angles of a screw thread, is ascertained by rotating the webbed ocular. One of the webs is brought coincident with a side and the milled head of the tangent screw, H, is turned until the web coincides with the other side. The angle is given on the scale and vernier, K, to 5'.

The milled head, L, actuates a tangent screw which inclines the object under examination to the optic axis; the degree of inclination is read to 5' by the scale and vernier, M. As the object lies in the same plane as the axis of rotation it does not go out of focus on being inclined. When the pitch of a screw is being measured the screw should be inclined the same number of degrees as the angle at which the thread crosses it; this angle can be approximated or else measured accurately by means of the circle attached to the ocular.

The object is focused by an ordinary rack and pinion coarse adjustment and a micrometer screw fine adjustment; the milled head, N, of this latter is divided to read direct to .01 mm. This divided head is of use in obtaining the correct position for viewing the profile of a screw thread. To effect this, the top of the thread is focused on the cross-wires of the ocular and the body is lowered by means of the fine adjustment an amount equal to the secant of the angle through which the screw is tilted on the stage multiplied by half the maximum diameter of the thread.

Extremely large objects, such as milling cutters, hobs up to 2½" diameter, etc., can be accommodated on the instrument by means of special arms attachable to the stage which holds adjustable male and female centres.

31216.	Microscope, as above described, with 1½ inch objective, cross-webbed ocular and complete set of chucks for carrying micrometer screws, small taps, etc., in strong wooden case.....	Duty Free	Duty Paid
31220.	Attachable arms, for carrying large objects.....	300.00	380.00
31224.	Extra Objectives 2 inch, 1 inch or ¾ inch focus.....	18.90	23.95
		6.30	8.00



Model A

Model C

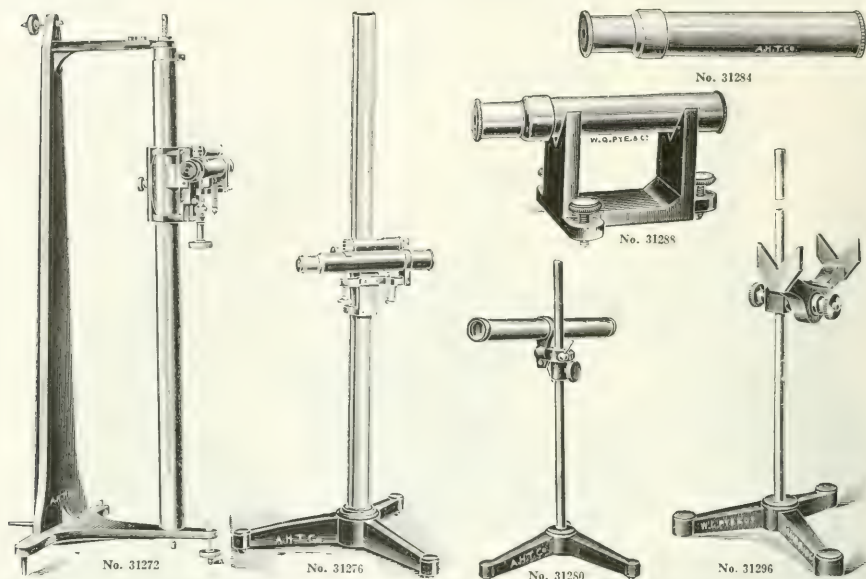
**MICROSCOPE, MEASURING, ZEISS, MODELS A, B AND C,** with horizontal movement of the microscope tube of either 20 or 50 mm and reading by means of micrometer head to  $\frac{1}{100}$  mm. Model A is intended for use with objects which may be placed upon the stage, i.e. graduations, small castings, etc., and especially for the measurement of the concavities in metals produced by the Brinell Ball Test. In large pieces or castings the microscope body is removed from the base and clamped in a regular laboratory support as in Fig. 2. Model B differs from Model A only in the base and stage arrangement which consists in a heavier base with revolving circular stage permitting two measurements of diameter, for instance, at 90° each from the other. Model C consists in a base, as in an ordinary microscope, with stage and mirror for the examination of photographic plates, spectrographs, or other objects by means of transmitted light. With model C higher power objectives may be used such as A<sub>3</sub> (26 diameters) and AA (54 diameters). The stage plate shown in illustration of Model A is removable so that the whole microscope with base may be conveniently placed upon large castings in the measurement of Brinell test depressions, etc.

	Duty Free	Duty Paid
31228. Model A, with horizontal motion of 20 mm, without objectives or oculars, in case.....	50.00	62.00
31232. Model A, with horizontal motion of 50 mm without objectives or oculars, in case.....	56.25	69.75
31236. Model B, with horizontal motion of 20 mm, with heavy base and removable revolving circular stage, without objectives or oculars, in case.....	65.00	80.60
31240. Model B, as above but with horizontal motion of 50 mm.....	71.25	88.35
31244. Model C, with horizontal motion of 20 mm, with stage and mirror for transmitted light, without objectives or oculars, in case.....	68.75	85.25
31248. Model C, as above but with horizontal motion of 50 mm.....	75.00	93.00
31252. " " with crosshairs and adjustable eyelens.....	4.25	5.27
31256. Achromatic Objective A <sub>1</sub> , giving a power with above ocular of 15 diameters..	3.00	3.72
31260. " " " " A <sub>2</sub> , 26 diameters.....	3.00	3.72
31264. " " " " AA, 54 ".....	7.50	9.30

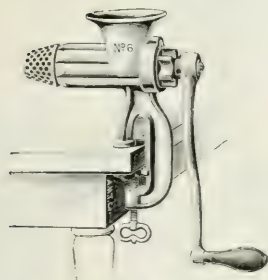
Note—Outfits may be made up with any of the above stands and optical equipment of oculars and objectives, but we offer the following as a typical outfit for Brinell test measurements, etc.

31268. Microscope, Measuring, Model A, with ocular 2 and objective A <sub>2</sub> , in case....	57.25	70.99
---	-------	-------

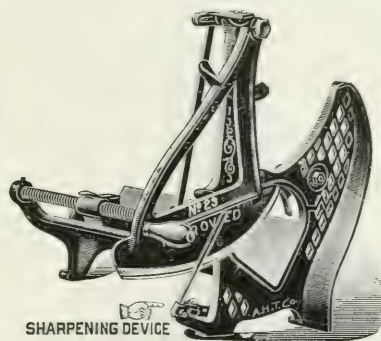
For more detailed information send for a copy of Zeiss, Mess 152.



- 31272. Cathetometer**, for either horizontal or vertical use, consisting of a brass bar, hexagonal section, mounted between two hardened steel centers and which can be clamped in any position in azimuth. The scale is divided in millimeters and the carriage is provided with spring and clamp. The position of the telescope is read by means of verniers to  $\frac{1}{100}$  of a millimeter. The telescope has a focal length of about 7 inches and a clear aperture of  $\frac{1}{4}$  inch and is provided with level and cross-wires and may be focused from infinity to within three feet.
- |                    |       |         |
|--------------------|-------|---------|
| Length of bar..... | 50 cm | 1 meter |
| Duty Free.....     | 51.00 | 72.00   |
| Duty Paid.....     | 64.60 | 91.20   |
- 31276. Cathetometer, or Reading Telescope**, with objective with a focal length of 6 inches and aperture of  $\frac{1}{4}$  inch, can be focussed from 3 ft. to infinity. Telescope is provided with crosshairs and level and fine adjustment screw for accurate setting in horizontal position. With vertical movement by rack and pinion to a distance of 24 inches. Very convenient in the laboratory for reading thermometers, barometer tubes, burettes, etc.
- |  |       |                |       |
|--|-------|----------------|-------|
| Duty Free.....   | 33.00 | Duty Paid..... | 44.00 |
| Extra with scale on vertical rod to be read by vernier to 0.02 mm. |       |                |       |
| Duty Free.....   | 9.0   | Duty Paid..... | 12.00 |
- 31280. Reading Telescope**, with objective 24 mm in diameter and crosshairs in ocular, with horizontal and vertical rotation and vertical adjustment, on support..... 17.50
- 31284. Reading Microscope**, with Ramsden eyepiece, with 5 mm scale divided into  $\frac{1}{10}$  mm. This is a most useful microscope for reading thermometers, electrosopes, etc; in general laboratory work. It is furnished with objectives of two foci and prices do not include any support. The magnifying power of the 4 cm focus is 20 diameters and of the 10 cm focus 12 diameters.
- |                                     |       |       |
|-------------------------------------|-------|-------|
| Focussing at approximately, cm..... | 4     | 10    |
| Duty Free.....                      | 8.25  | 8.25  |
| Stock .....                         | 12.10 | 12.10 |
- 31288. Reading Microscope**, as above, but with V-shaped support and levelling screws.
- |                                     |       |       |
|-------------------------------------|-------|-------|
| Focussing at approximately, cm..... | 4     | 10    |
| Duty Free .....                     | 10.05 | 10.05 |
| Duty Paid .....                     | 14.75 | 14.75 |
- 31292. Tele-Microscope**, exactly similar in appearance to the above Reading Microscope but with special lenses to give high magnification and wide field and with a draw-tube enabling it to be used at various distances. A very useful laboratory microscope and particularly recommended for use in reading electroscope leaves in the measurement of radio-activity and as used for this purpose by Thomson, Rutherford, etc. The eyepiece scale is 10 mm long divided in 1 mm and with the draw-tube closed the instrument focusses at approximately 15 cm distance with a magnification of 20 diameters and with draw-tube open focusses at 10 cm with a magnification of 50 diameters. Without support.
- |                 |       |             |       |
|-----------------|-------|-------------|-------|
| Duty Free ..... | 12.00 | Stock ..... | 17.60 |
|-----------------|-------|-------------|-------|
- 31296. Tripod Support**, convenient for use with either of above Reading Microscopes, with V-shaped rest two adjusting screws and spring clamp (not shown in illustration) to hold microscope tube in position
- |                 |      |                 |       |
|-----------------|------|-----------------|-------|
| Duty Free ..... | 7.50 | Duty Paid ..... | 11.00 |
|-----------------|------|-----------------|-------|



No. 31284



SHARPENING DEVICE

No. 31288



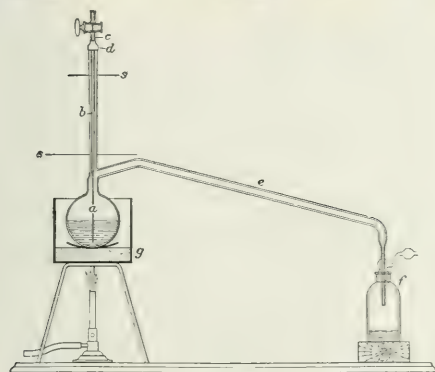
No. 31292



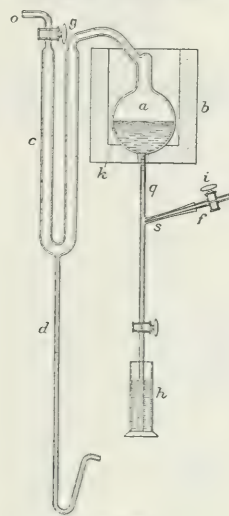
No. 31296



No. 31300



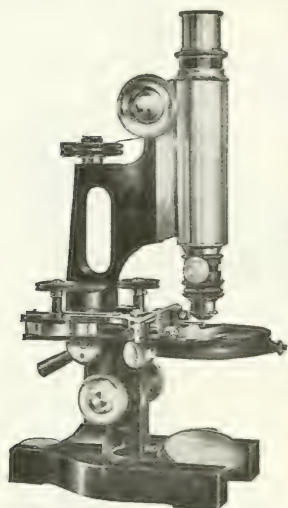
No. 31304



No. 31308

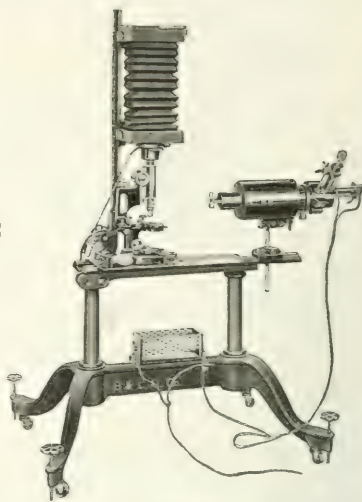
31284. Meat Chopper, useful for the preparation of meat for culture media. Leaves no meat in the machine and is easily cleaned.
- |                    |               |      |      |      |      |
|--------------------|---------------|------|------|------|------|
| Number.....        | 1             | 2    | 4    | 6    | 8    |
| Capacity, lbs..... | $\frac{1}{2}$ | 1    | 2    | 3    | 4    |
| Each.....          | 1.25          | 1.50 | 2.00 | 3.00 | 4.50 |
31288. Meat Cutter for Bagasse, etc., for cutting in preparation for laboratory analyses. With automatic feed giving shavings from  $\frac{1}{4}$ th inch thick down to the thickness of thin paper..... 8.00
31292. Melting Point Tube, Thiel, of hard glass..... 1.00
31296. Mercury Trough, of porcelain, cross form, holding 3 kilos of mercury..... .75
31300. " " of porcelain.
- |                      |      |      |
|----------------------|------|------|
| Capacity, kilos..... | 4    | 8    |
| Each.....            | 1.00 | 2.00 |
31304. Mercury Still, Hulett, as used in the U. S. Bureau of Mines Experiment Station, Pittsburgh, Pa. See Bulletin No. 42 of the U. S. Bureau of Mines and Physical Review, Vol. 34, 1911, p. 307, consisting of flask of 500 cc capacity, with long neck and side tube, as illustrated, which is sealed to the outlet tube of a Drechsel wash bottle. The asbestos air bath, asbestos disc "S" tripod and burner, are not included in the price..... 3.00
31308. Mercury Still, Hulett, for electric heating. Glass parts only, without electric heater "B." See Bulletin No. 42 of the U. S. Bureau of Mines..... 5.60





No. 31316

# METALLOGRAPHIC APPARATUS



No. 31320

**MICROSCOPE, METALLURGICAL, SAUVEUR-BAUSCH AND LOMB, latest model Handle Arm Type** with lever fine adjustment, with rack and pinion for the raising and lowering of the stage so that focusing may be done without moving the vertical illuminator out of the optical axis of the illuminating system and also providing a much greater working distance for thick specimens. With circular revolving stage with large size opening ( $1\frac{1}{2}$  inches) in the center, for convenience in manipulating the Sauveur magnetic specimen holder. This is the most widely used microscope in metallurgical laboratories in the U. S. and the outfit as regularly supplied consists of Sauveur Metallurgical Stand; two oculars, 10X and 5X; three special metallographic objectives, i.e. short mounted and corrected for use without cover glass, of 32, 16 and 4 mm e.f.; vertical illuminator; two stage specimen holders, one magnetic and the other non-magnetic, and auxiliary tube, in polished case.

31312. Microscope, as above, without Sauveur Mechanical Stage ..... 128.00

31316. Microscope, as above, with Sauveur Mechanical Stage as shown in illustration ..... 150.00

**MICRO-PHOTOGRAPHIC APPARATUS FOR METALLOGRAPHY, SAUVEUR-BAUSCH & LOMB.** This outfit offers the advantage of a photo-micrographic outfit with microscope which may be removed for regular work on the table and instantly replaced in proper position on the outfit or mounted with the illuminant on one solid support with all adjustments.

**Supporting Stand**—Of cast iron, neatly finished and very stable; has four supports with 23-inch lateral spread, provided with both castors and leveling screws; carries plate,  $21 \times 7\frac{1}{2}$  in., at height of 22 in. from floor, to which plate are attached the optical beds.

**Optical Beds**—Two in number, of lathe type, carefully planed, one accommodating supports for the microscope, are lamp with condensing system, table for macroscopic photography (of rail sections, etc.), and parts for lantern slide and transparent microscopic projection when these are desired. The other, graduated to 640 mm., carries camera and is attached to base plate by strong hinge joint, permitting the camera to be used in any position from vertical to horizontal.

**Illuminant**—90 deg. hand feed arc lamp for use with direct or alternating current, enclosed in a small cylindrical hood with observation windows, attached to rear of condensing mount; carbon adjustment so arranged as to be conveniently reached from the observer's position either at the microscope or at the camera. Carbons may be adjusted either separately or together.

**Condensing System**—Triple condensing system with lenses  $4\frac{1}{2}$  in. diam. in patent ventilated mount, which is in turn mounted in a cylindrical metal hood, 9 in. long and 5 in. diam., in which the condensers may be easily adjusted to and fro with reference to the lamp; a cylindrical extension slips over the end of the hood and helps to render the apparatus more nearly light-tight; a spring clip is provided for holding filter screens. A green monochromatic screen is provided with the outfit, as this has been found to be almost indispensable for the best photomicrographic work; entire illuminating apparatus is carried by a special fork and standard, adjustable for height and also to and fro on the optical bed, and provided with conveniently located adjustment screws for shifting its direction vertically or laterally. The lamp may also be tilted at an angle for transparent and for oblique illumination.

**Camera**—Regularly supplied with camera for  $5 \times 7$  in. plates and smaller, having a maximum bellows draw of 24 in., equipped with double plate holder with reducing kits for  $4 \times 5$  in. and  $3\frac{1}{2} \times 4\frac{1}{2}$  in. plates and a ground glass screen with clear center; in adjustable mounting on two supports clamped to optical bed; front standard fitted with sliding light-tight tube to connect with microscope. A similar camera to take  $4 \times 5$  and  $3\frac{1}{2} \times 4\frac{1}{2}$  in. plates can be supplied at a reduction of \$10.00 in the price. We strongly recommend the regular  $5 \times 7$  camera, however.

**Shutter**—Automatic with steel leaves, having a maximum opening of 10 mm. may be set with instantaneous, bulb or time exposure.

31320. Micro-photographic Outfit, as above described, including Sauveur-Bausch & Lomb Metallographic Microscope No. 31316 with Mechanical Stage and 5 ampere rheostat for 110 volt circuit. .... 310.00

31324. Micro-photographic Outfit, as above, for 220 volts. .... 311.50

31328. " " " " without Mechanical Stage. .... 288.00

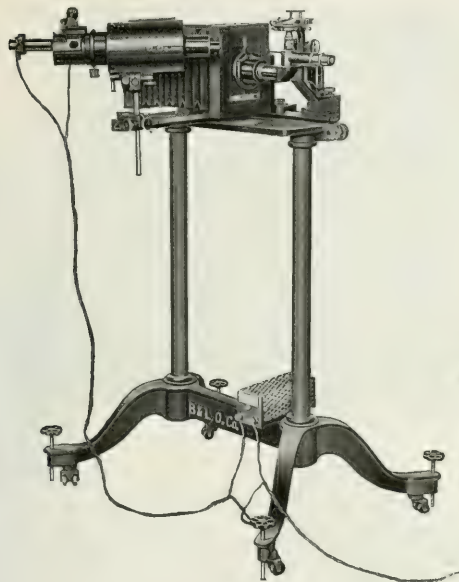
31332. " " " " Microscope. .... 160.00

**Note**—If a  $4 \times 5$  camera is desired \$10.00 may be deducted from each of the above prices.

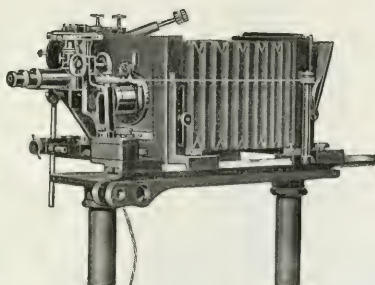
31336. Set of Lantern Slide Accessories consisting of supports, bellows, slide carrier, mounted condenser and  $1\frac{1}{2}$  inch diameter projection lens of either 6, 8 or 10 inch focus, as desired. .... 17.50

31340. Extra Carbons for lamp. Please state whether current is alternating or direct. Per 100. .... 2.50

31344. Focussing Glass. .... 4.00



No. 31348



No. 31348

**MICRO-PHOTOGRAPHIC OUTFIT FOR METALLOGRAPHY WITH INVERTED SAUVEUR-BAUSCH & LOMB METALSCOPE.** The microscope included with this outfit is of the inverted or Le Chatelier type, with fine adjustment controlled from the rear of the camera by a small milled head pulley. The illuminant is set at a convenient angle to the bed of the camera and arc may be conveniently set without movement from the position necessary at time of focusing. A separate microscope tube is provided for visual examination and with the vertical illuminator permanently fixed the only adjustment necessary is the arc lamp.

**Supporting Stand**—Of cast iron, neatly finished and very stable; with four supports with 25-inch lateral spread, provided with both castors and leveling screws; carries plate, 21 x 7½ in., at height of 40 in. from floor, to which plate are attached the optical beds.

**Optical Beds**—Two in number, of lathe type, carefully planed, one accommodating supports for the arc lamp with condensing system. The other, graduated to 640 mm, carries the camera.

**Microscope**—As described above.

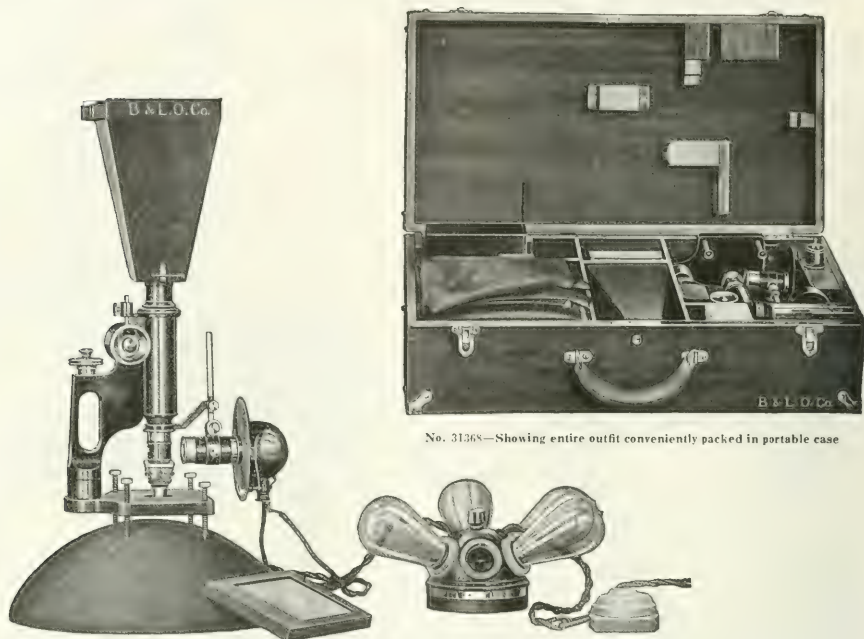
**Illuminant**—90 deg. hand feed arc lamp consuming about 4½ amps. for use with direct or alternating current, enclosed in a small cylindrical hood with observation windows, attached to rear of condensing mount; carbon adjustments so arranged as to be conveniently reached from the observer's position either at the microscope or at the camera. Carbons may be adjusted either separately or together.

**Condensing System**—Triple condensing system with lenses 4½ in. diam. In patent ventilated mount, which is in turn mounted in a cylindrical metal hood, 9 in. long and 5 in. diam., in which the condensers may be easily adjusted to and fro with reference to the lamp; a cylindrical extension slips over the end of the hood and helps to render the apparatus more nearly light-tight; a spring clip is provided for holding filter screens. A green monochromatic screen is provided with the outfit, as this has been found to be almost indispensable for the best photomicrographic work; entire illuminating apparatus is carried by a special fork and standard, adjustable for height and also to and fro on the optical bed, and provided with conveniently located adjustment screws for shifting its direction vertically or laterally.

**Camera**—Regularly supplied with horizontal camera for 5 x 7 in. plates and smaller, having a maximum bellows draw of 24 in., equipped with double plate holder with reducing kits for 4 x 5 in. and 3½ x 4½ in. plates and a ground glass screen with clear center; in adjustable mounting on two supports clamped to optical bed; front standard fitted with sliding light-tight tube to connect with metaloscope. A similar camera to take 4 x 5 and 3½ x 4½ in. plates can be supplied at a reduction of \$10.00 in the price. We recommend the regular 5 x 7 camera, however.

**Shutter**—Automatic with steel leaves, having a maximum opening of 40 mm may be set with instantaneous, bulb or time exposure.

- |        |   |        |
|--------|---|--------|
| 31348. | Micro-photographic Outfit, as described above, including three special metallographic objectives, 16 mm and 4 mm in long mounts and 32 mm in short mount, all corrected for use without covers; four oculars, two each of 6.4X and 10X; vertical illuminator, two Sauveur specimen holders, one magnetic and one non-magnetic; inverted Metaloscope stand; camera with automatic shutter and pulley for controlling fine adjustment of microscope as above described, with 5 ampere rheostat for 110 volts and with Sauveur Mechanical Stage..... | 345.00 |
| 31352. | Micro-photographic Outfit, as above, with rheostat for 220 volts.....   | 346.50 |
| 31356. | “ “ “ “ without Mechanical Stage.....   | 323.00 |
| 31360. | Focussing Glass.....  | 4.00   |
| 31364. | Extra Carbons for lamp. Please state whether current is direct or alternating. Per 100.....   | 4.00   |
- Note—If 4 x 5 camera is preferred, \$10.00 may be deducted from each of the above prices.



No. 31368—Showing entire outfit conveniently packed in portable case

No. 31368—In position for use on a casting and with electric illumination

**METALLOGRAPHIC MICROSCOPE AND CAMERA.** TASSIN-BAUSCH & LOMB, a portable outfit for the microscopical investigation of structural metals and other surfaces; particularly designed for the practical study of the forging, casting or bar as it is turned out rather than from specimens cut from the piece which must be taken to the laboratory for examination. The Tassin Apparatus consists essentially of three parts, the Microscope, the Illuminating Apparatus and the Camera.

**Microscope**—The microscope is of Bausch & Lomb handle arm type. It has a large stage which is provided with leveling screws and forms the base of the instrument. The stage measures 119 x 92 mm, with a distance of 41 mm from its center to the base of the arm. The effective length of the leveling screws is 36 mm. The object under examination is viewed through a circular aperture in the stage, 31 mm in diameter. The stage, of course, may also be used in the regular way when the size of the specimen permits.

The body tube, carrying the objective, illuminating apparatus and ocular, is moved up and down by a rack and pinion adjustment for approximate focusing, the exact focus being obtained by means of a fine adjustment of lever type with a milled micrometer head. A post with clamp is attached to the body tube so that the tube, after the focus has been obtained, cannot be forced down while attaching the camera, thus eliminating all risk of disturbing the focus or injuring the objective by forcing it down against the object.

**Illuminating Apparatus**—At the lower end of the body tube is attached the illuminating apparatus, to which in turn is fastened a quick changing nosepiece, permitting a ready interchange of objectives. The illuminating apparatus shown in position in illustration, consists of a vertical illuminator and an arm, to the outer end of which is clamped an upright metal arm, carrying a condensing system in an adjustable tube, a metal shield and an illuminant attached at the rear of the shield.

The illuminant may be either a 6-volt, 16 c.p. Mazda lamp or a small Acetylene burner, both of which are supplied with the complete outfit. The former illuminant is shown in illustration, the Mazda lamp being mounted in a metal hood attached to the shield by clips fitting over insulated lugs.

A resistance bank is supplied for use with the Mazda lamp to permit one to take current from either the regular 110- or 220-volt, direct or alternating circuit. This resistance bank is provided with six lamp sockets but is furnished without lamps. If it is desired to use the Mazda lamp regularly supplied with a 110-volt circuit, either direct or alternating, the bank should be equipped with two 32 c. p. and 16 c. p. carbon lamps; if a 220-volt circuit is to be used, the lamp should be fitted with five 32 c. p. carbon lamps.

When acetylene is to be used, the burner is attached to the back of the shield by means of a rod and clamp. The gas may be supplied by a charged acetylene tank, as used on automobiles, or by the generator listed.

Within the vertical illuminator is an adjustable reflector of clear glass. Openings in the mounting permit the light from the illuminant to reach this reflector, which directs it upon the object. Adjustments are provided for centering the light properly. After the correct position has once been established, no further attention need be paid to the position of the light source since it travels with the body tube in focusing.

**Camera**—The camera is of metal, 10 inches in length. It is provided with a focusing ground glass, two double plate holders for 3 x 3-inch plates and a small trap shutter. The front board is fitted with a draw tube which is inserted in the body tube of the microscope in place of the regular draw tube when making a negative. Two oculars are therefore desirable, one for each draw tube.

The three objectives regularly supplied, i.e., the 32, 16 and 8 mm, when used with a 7.5X ocular, will give magnifications of 30, 60 and 150 diameters, respectively.

Since one may often wish to know, before leaving the job, what sort of negatives he has obtained and there may not be a dark room at hand, we provide a changing bag and a tank for daylight developing to meet this contingency. Any good orthochromatic plate may be used with any standard developer and fixing solution.

Price list on following page.



31368.	Tassin Metallographic Equipment complete, as above, consisting of the following parts: special microscope stand; quick changing nosepiece with three rings; two eyepieces, 7.5X; three objectives, 32, 16 and 8 mm; vertical illuminator; Tassin illuminating apparatus complete for acetylene; electric light attachment with Mazda lamp; resistance bank with cord, fuse block and connecting plug; Never Out Acetylene Generator No. 3 with six feet of rubber tubing; camera; 2 doz. Seed plates; hand magnifier; package of developing powders; focusing cloth; changing bag; carrying case with fittings	122.00
31372.	Special Microscope with stage 119 x 92 mm, with four leveling screws, rack and pinion and lever fine adjustments	26.75
31376.	Quickchanging Nosepiece with three rings	7.00
31380.	Eyepiece 7.5X	1.50
31384.	Objective 32 mm	4.00
31388.	Objective 16 mm	5.00
31392.	Objective 8 mm	8.00
31396.	Vertical Illuminator	6.50
31400.	Tassin Illuminating Apparatus for acetylene	15.00
31404.	Tassin Illuminating Apparatus for electricity including illuminator, hood, 6-volt Mazda lamp and socket	17.50
31408.	Electric Light Attachment consisting of hood, lamp and socket	3.50
31412.	Resistance Bank with snap switch and sockets for six lamps, fuse block, cord and plug; necessary for use with electricity; furnished without lamps	7.50
31416.	Never Out Acetylene Generator No. 3	9.00
31420.	Camera with ground glass, two plate holders, shutter and draw tube	13.50
31424.	Changing bag	1.25
31432.	Developing tank	4.00
31434.	Carrying Case	8.00

**METALLOGRAPHIC MICROSCOPE, REICHERT.** The advantage of this instrument is the manner in which the light is brought to bear upon the preparation and the more perfect quality of the illumination obtained thereby. The specimen requires one prepared surface only, which does away with the necessity of providing it with two approximately parallel planes, the instrument being so arranged that the polished surface rests upon a stage set accurately at right angles to the optic axis. The apparatus is fitted with convenient appliances for taking rapidly a series of photographs; a new and convenient form of slow adjustment with slide motion and micrometer screw at the side, the whole acting on the principle of the screw and inclined plane and thereby furnishing an exceedingly sensitive and exact adjustment.

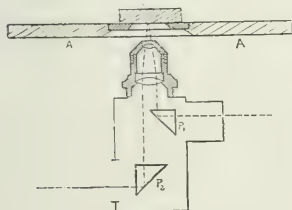


Fig. 4

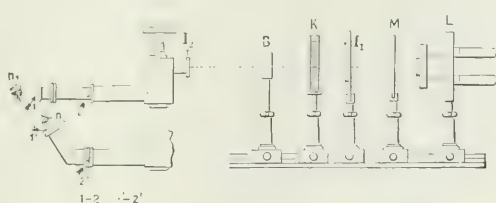


Fig. 5

Fig. 4 shows diagrammatically the path of the rays. The rays emitted by the source of light are brought to bear upon the object by means of a prism and the objective, the function of the latter being both that of a magnifying lens and that of a condenser. The light reflected at the object passed into the prism  $P_2$ , by which means it is deflected into the horizontal tube  $I$  and so reaches the observer's eye. To pass from observation with the eye to photographic records the prism marked  $P_2$  in Fig. 4 can be given a quarter turn about an axis at right angles to the plane of the stage. The photographic plate, as shown in Fig. 7, is placed at right angles to the optical bench which carries the illuminating appliances. To facilitate the observation of the image the instrument may have appended to it an eyepiece elbow fitting which is inserted into the sleeve of the horizontal tube of the microscope. The rays are deflected upwards by a prism and thence pass through the eyepiece to the eye. The advantage of this arrangement is that it enables the worker to assume his accustomed posture. Fig. 5 shows the arrangement of the illuminating appliances and their order of sequence. A suitable illumination is furnished by any of the usual sources, such as Welsbach burners, Nernst lamps, Liliput arc lamps, and arc lamps taking large currents, whilst in photomicrographic work preference should be given to one of the three last named sources. The whole of the illuminating appliances, the wheel diaphragm  $I$  (Fig. 5) and the condensing lens  $B$  are accommodated in a tube fitting which attaches to the microscope stand. In the same tube there is a slit for the glass screens and the light filter trough furnished with the microscope.

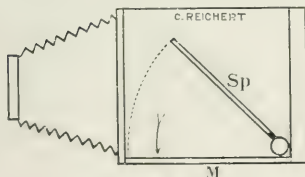


Fig. 8

Externally the complete Metallograph presents the form shown in Fig. 6. It will be seen that a heavy sole-plate is surmounted by a pillar, which, like other Reichert microscope stands, is provided with a loop serving as a convenient handle for lifting the microscope. This pillar carries the rack and pinion mechanism for the coarse motion of the stage, as well as a mirror capable of being moved in all directions.



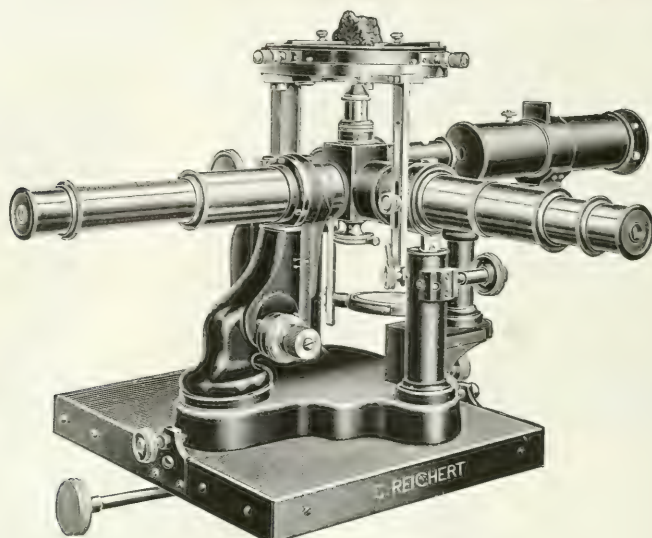


Fig. 6. No. 31436. Microscope with Circular Mechanical Stages

# METALLOGRAPHIC MICROSCOPE, REICHERT, (cont.)

The stage of the microscope is of the revolving and centering type, two screws being fitted to the side of the stage frame by means of which the specimen may be displaced by a few millimeters in any direction. Larger displacements may either be made by hand or with the aid of the compound mechanical stage. Fig. 7 represents this microscope as set up in combination with a photographic apparatus. The latter rests with its heavy metal feet upon an optical bench set at right angles to the centre line of the illuminating appliances. The tube facing the camera is optically connected with the latter by means of a sleeve and socket arrangement. The picture on the camera screen can be readily focused with great nicety by means of the movable eye lens of the projection eyepiece without in any way interfering with the adjustment of the eyepiece in the drawtube. To make the transition from ocular observation to photomicrography all that is necessary is to turn the small lever under the prism mount horizontally up to its stop. An image which has been sharply focused with respect to the ordinary eyepiece will then appear sharply upon the camera screen. Nevertheless, especially when light filters are being used, it is advisable to complete the fine adjustment by focusing on the screen. In this case the slow motion is transmitted to the microscope by means of a Hooke's key fitted with a socket by which it may be attached to the micrometer head facing the camera.

The Camera of the metallographic apparatus may be fitted with a focusing mirror, which adds materially to the ease and rapidity with which the apparatus can be used. It enables the observer, after completing the adjustment of the microscope, to obtain a sharp focus on the ground glass focusing screen without having to leave his seat. The ground glass focusing screen M is in this case at the side and parallel to the track of the camera, whilst the dark slide K remains in its usual position. It will be seen that the vertical mirror Sp, as shown in Fig. 8 is hinged between the ground glass focusing screen M and the dark slide K and may be turned about its axis by means of the lever fitted to the outside of the case. To view the image on the screen the mirror should be placed at an angle of 45° to the axis of the camera (Fig. 8) and during exposure it should be turned back in the direction of the arrow so as to lie close to the ground glass screen. This arrangement is particularly convenient in all cases where the use of feeble sources of light coupled with high magnifications necessitate long exposures. In such cases the arrangement may be readily controlled during the exposure.

31436.	Metallographic Microscope, Reichert, as shown in Fig. 6. with rack and pinion coarse adjustment, micrometer screw fine adjustment with milled heads at the side reading displacements of 0.001 mm, with centring revolving stage, also with wheel diaphragm, condensing lens, two glass screens, and one light-filter trough in a tube fitting. Without objectives or eyepieces.....	Duty Free 126.00	Duty Paid 168.00
31440.	Objective, No. 2.....	5.10	6.80
31444.	Apochromatic Objective, 16 mm.....	18.00	24.00
31448.	“ “ 8 mm.....	25.50	34.00
31452.	“ “ 4 mm.....	31.50	42.00
31456.	“ “ 3 mm.....	34.50	46.00
31460.	Apochromatic Immersion Lens 2 mm.....	75.00	100.00
31464.	Compensating Eyepiece, No. 4.....	4.80	6.40
31468.	“ “ 6.....	4.80	6.40
31472.	“ “ 8.....	4.80	6.40
31476.	Micrometer Eyepiece “ III.....	3.60	4.80

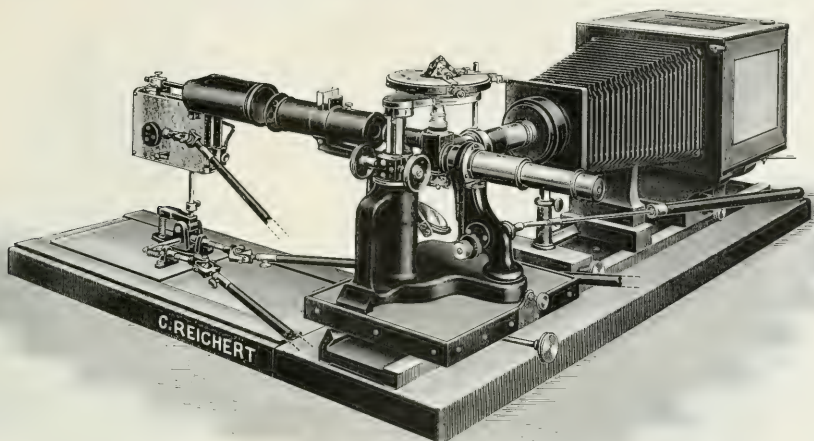
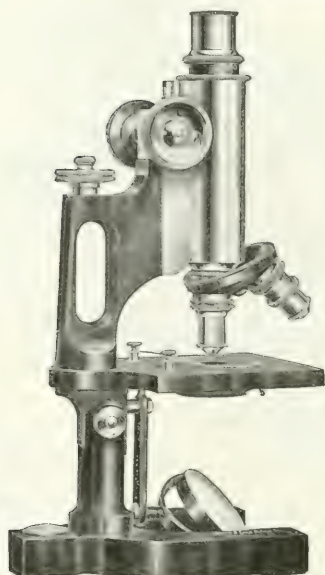


Fig. 7. No. 31436. Microscope with No. 31484 Circular Mechanical Stage, No. 31504 Photographic Camera and Base Plate, No. 31536 Hand Regulating Arc Lamp, No. 31508 Hooke's Key for focussing at a distance and No. 31552 Universal Motion for Adjusting the Lamp

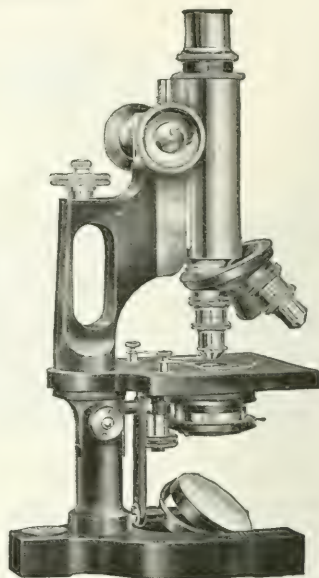
31480.	Attachable and Recording Mechanical Stage giving two motions at right angles to one another, the ranges of the respective motions being 30 mm. The magnitudes of the motions can be read with the aid of scales and verniers, and hence the position of any given element may be recorded and found without searching.		
	Duty Free	25.50	Duty Paid. 34.00
31484.	Large Circular Mechanical Stage for attachment in the place of the centring and revolving stage usually employed. It has a diameter of 120 mm, it may be rotated and gives two motions at right angles to one another through a range of 20 mm. The magnitude of the motions can be read to 0.01 mm with the aid of verniers and divided drums. The stage is interchangeable with respect to the fixed stage, which is better adapted for the examination of large pieces of metal. Additional price of both stages.		
	Duty Free	30.00	Duty Paid. 40.00
31488.	Eye-piece Elbow Mount with prism for observation from above, to slip into the drawtube of the microscope (Fig. 5)	6.30	8.40
31492.	Stage Micrometer ruled upon metal, being one millimeter divided into 100 parts.	2.55	3.40
31496.	Ground Glass Screen with etched scale of millimeters for use in conjunction with a stage micrometer for ascertaining the magnification furnished by a photograph.	3.75	5.00
31500.	Ground Glass Screen for ocular observation, to secure greater uniformity in the illumination when arc lamps are used, on stand.	3.75	5.00
Photographic Equipment for use with Reichert Metallographic Microscope.			
31504.	Large Base Plate with two Optical Benches, Microscope Base, and Photomicrographic Camera, the latter being provided with a ground glass and plain plate glass focusing screen and a dark-slide to take 13 x 18 cm (7 1/2 x 5 in.) plates and carriers to take 9 x 12 cm (4 1/2 x 3 1/4 in.) plates. The bellows give an extension of 75 cm (30 inches)	Duty Free 50.10	Duty Paid 66.80
31508.	Hooke's Key for focussing from a distance.	3.00	4.00
31512.	Projection Eye-piece No. 2.	12.00	16.00
31516.	" " " " No. 4.	12.00	16.00
31520.	One Extra Double Dark-slide.	6.30	8.40
31524.	One Focusing Lens.	4.20	5.60
New Nernst Lamp on stand to raise and lower			
31528.	a) for a supply pressure of 80-200 Volts.	9.75	13.00
31532.	b) " " " " " 200-300 "	9.75	13.00
31536.	Small Hand Regulating Arc Lamp with carbons placed at right angles to one another, taking 4 amperes.	12.75	17.00
31540.	Ditto with Hooke's Key for operating from a distance.	18.75	25.00
31544.	Resistances for lamp No. 31536 for 110 volts.	4.50	6.00
31548.	Large Hand Arc Lamp with carbons placed at right angles to one another, in metal casing, wound for a current of 10-30 amperes.	56.25	75.00
31552.	Universal Motion Fitting for adjusting lamp No. 31548 in every direction, with two Hooke's keys.	16.80	22.40

## MICROSCOPES AND ACCESSORIES



No. 31604—BH2  
with stage iris diaphragm

The BH Microscopes are probably more widely used throughout the U. S. for students' laboratory work than any other make or type of Microscope.



No. 31616—BH8  
with regular quick acting screw substage

**MICROSCOPE, BAUSCH & LOMB TYPE BH.** This microscope is probably more widely used for students' laboratory work in the U. S. than any other make or type of instrument. It was the first Handle Arm Microscope with the modern adaptation of the lever fine adjustment and was such a pronounced success that the modification of the other instruments, BBH, CAH and DDH, rapidly followed. With the addition of a substage of the quick acting screw type, Abbe condenser, and iris diaphragm, the BH type is available for bacteriological and other work requiring the use of the oil immersion objective of 1.9 mm focus. This is designated as the BH8.

**Body Tube**—Provided with society screw thread; draw tube graduated in single millimeters with every tenth line numbered, adjustable in cloth lined sleeve, or in metal fitting if so specified, and provided with society screw thread for the use of low power objectives.

**Focusing Adjustment**—Coarse adjustment by standard rack and pinion; fine adjustment of the Bausch & Lomb lever type with two-sized knurled head for slow and rapid movement, ceasing to operate when objective touches the slide.

**Stage of BH1 to 4**—Of metal completely covered with vulcanized rubber, measuring 103 x 101 mm, with a distance of 59 mm from center to base of arm, provided with spring clips, an iris diaphragm so mounted as to be readily detached if desired and screw threads for attaching a substage ring to hold an Abbe condenser; iris diaphragm controlled by knurled ring, operated from any point of its circumference.

**Substage of BH8**—Adjustable for focus by a quick-acting screw; consists of a mounting for the Abbe condenser and an iris diaphragm, which comes into the plane of the stage when the screw is turned up as far as possible, allowing the condenser to be used in immersion contact with the slide; substage is swung to the left of the optical axis when screw reaches the limit of motion downward; iris diaphragm is automatically locked against closing when condenser is in position.

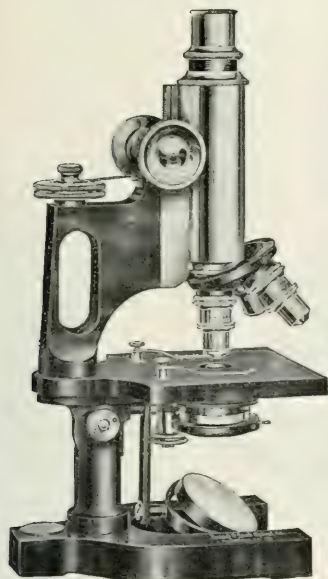
**Finish**—Main parts including body tube in alcohol proof black, adjustment heads in yellow.

**Case**—of hard wood with polished finish, fitted with brass lock and key.

	Outfit	Objectives		Eyepieces	Nosepieces	Abbe Condenser	Price
		Dry	Oil Immersion				
31600.	BH1	16 mm	4 mm	7.5 ×			27.50
31604.	BH2	16 mm	4 mm	7.5 ×	Circular Double		31.50
31608.	BH3	16 mm	4 mm	5 × 10 ×			29.00
31612.	BH4	16 mm	4 mm	5 × 10 ×	Circular Double		33.00
31616.	BH8	16 mm	4 mm 1.9 mm	5 × 10 ×	Circular Triple	1.20 N. A.	70.00

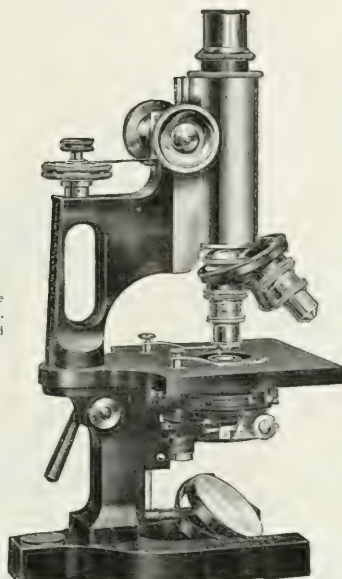
**Note**—Microscopes BH1, BH2, BH3 and BH4 are furnished with a substage ring and Abbe condenser 1.20 N. A., in an iris diaphragm mounting at an additional cost of \$7.50. The Abbe Condenser in the BH8 outfit is supplied in the regular quick acting Screw Substage. The above are the outfits regularly supplied. Prices on special outfits quoted on application.





No. 31640-BBH8  
with regular quick-acting screw substage

The BBH8 Microscope is the standard throughout the U. S. for medical and other advanced laboratory work.



No. 31660-CAH8  
with complete substage

**MICROSCOPE, BAUSCH AND LOMB TYPES BBH AND CAH.** The BBH Microscope is the handle arm successor of the BB Microscope which was for many years the standard microscope throughout the United States for physicians' use and for laboratory work in all advanced work. The CAH Microscope differs from the BBH only in size and having the complete substage and is recommended for the individual use of scientists doing more advanced work. Unless otherwise stated the following specifications apply to both types.

**Body Tube**—Outside diameter, 39 mm; provided with society screw thread; standard size eyepieces are used; draw-tube graduated in single millimeters with every tenth line numbered, adjustable in cloth-lined sleeve, or in metal fitting, if so specified, and provided with society screw thread for the use of low power objectives.

**Focusing Adjustment**—Coarse adjustment by standard rack and pinion; fine adjustment of Bausch & Lomb lever type with double knurled micrometer screw head for slow and rapid movement, the larger part graduated into 100 divisions, each equal to .0025 mm in vertical movement, and provided with a hinged indicator, which may be turned back from the head; fine adjustment ceases to operate when objective touches the slide.

**Stage**—of BBH—of metal, covered with vulcanized rubber; measures 120 x 107 mm, with a distance of 70 mm from its center to base of arm; provided with spring clips.

**Stage**—of CAH—as above, measures 125 x 115 mm; with a distance of 75 mm from its center to base of arm.

**Substage**—of BBH—adjustable for focus by a quick acting screw; consists of a mounting for the Abbe condenser and an iris diaphragm, which comes into the plane of the stage when the screw is turned up as far as possible, allowing the condenser to be used in immersion contact with the objective, if desired; substage is swung to the left of the optical axis when screw reaches the limit of motion downward.

**Substage**—of CAH—complete with swing-out condenser of Bausch & Lomb new construction, and arranged to take all the substage accessories; adjustable by standard rack and pinion; upper iris diaphragm of dome shape, self-locking, combined with Abbe condenser, the whole easily removable from substage; Abbe condenser removable from optical axis by a double swing movement to one side, releasing upper iris diaphragm for use; lower iris diaphragm adjustable laterally by rack and pinion for oblique illumination, revolvable about its own axis and mounted on a swinging arm allowing it to be swung entirely out of the optical axis.

**Finish**—Main parts including body tube in alcohol proof black, adjustment heads in yellow.

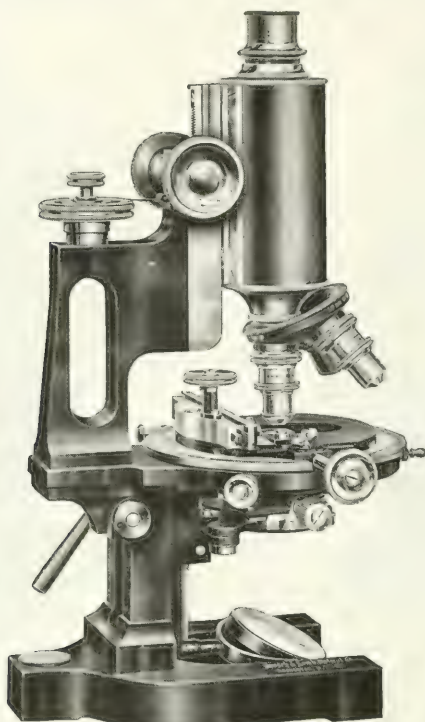
**Cases**—Of hard wood with polished finish; fitted with brass lock and key.

#### Objectives

	Outfit	Dry	Oil Immersion	Eyepieces	Nosepieces	Abbe Condenser	Price
31620.	BBH1	16 mm 4 mm		7.5 X			41.50
31624.	BBH2	16 mm 4 mm		7.5 X	Circular Double		45.50
31628.	BBH3	16 mm 4 mm		5 X 10 X			43.00
31632.	BBH4	16 mm 4 mm		5 X 10 X	Circular Double		47.00
31636.	BBH6	16 mm 4 mm		5 X 10 X	Circular Double	1.20 N. A.	54.50
31640.	BBH8	16 mm 4 mm	1.9 mm	5 X 10 X	Circular Triple	1.20 N. A.	80.00
31644.	CAH1	16 mm 4 mm		7.5 X		1.20 N. A.	76.00
31648.	CAH2	16 mm 4 mm		7.5 X	Circular Double	1.20 N. A.	80.00
31652.	CAH3	16 mm 4 mm		5 X 10 X		1.20 N. A.	77.50
31656.	CAH4	16 mm 4 mm		5 X 10 X	Circular Double	1.20 N. A.	81.50
31660.	CAH8	16 mm 4 mm	1.9 mm	5 X 10 X	Circular Triple	1.20 N. A.	110.00

**Note:** The new swing-out mounting for the Abbe Condenser with upper and lower iris diaphragms, is substituted for the regular one in the BBH8 and BBH8 outfits at an additional cost of \$3.00. When ordering this mounting, please specify "screw substage with swing-out condenser."





No. 31680—DDHs with Revolving Mechanical Stage  
and Complete Substage

**MICROSCOPE, BAUSCH AND LOMB TYPE DDH.** This is the largest and most elaborate of the Bausch and Lomb Handle Arm series and is particularly designed for advance research work, photo-micrography, etc.

**Pillar**—Double rectangular in section, provided with inclination joint and clamping lever to secure the instrument in any position and with stops in the vertical and horizontal positions.

**Body Tube**—Of aluminum, 50 mm outside diameter; provided with society screw thread; standard size eyepieces are used; draw tube graduated in single millimeters with every tenth line numbered, adjustable in cloth-lined sleeve, or in metal fitting, if so specified, and provided with a society screw thread; lower collar may be removed for attaching the Micro-Tessar, 72 mm objective.

**Focusing Adjustment**—Coarse adjustment by standard rack and pinion; fine adjustment of Bausch & Lomb lever type with micrometer screw head in two parts for slow and rapid movement, the larger graduated into 100 divisions, each equal to .0025 mm, in vertical movement, and provided with a hinged indicator, which may be turned back from the head.

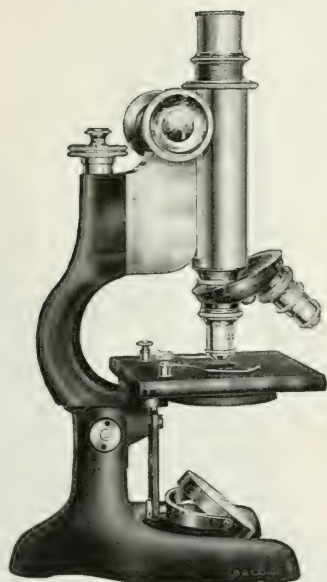
**Stage**—Revolving mechanical, with circumference graduated into single degrees and read by a convenient vernier; measures 125 mm outside and 112 mm inside the graduations; provided with two rack and pinion movements, covering a range of 75 mm and 35 mm, respectively; provided with centering screws, and removable for substitution of plain stage, if desired, or upper part may be removed, leaving a large, flat surface with one rack adjustment.

**Substage**—Complete with swing-out condenser and so arranged that all substage accessories, inserted into the upper sleeve, may be easily employed; adjustable by standard rack and pinion; upper iris diaphragm of dome shape, self locking, combined with Abbe condenser, the whole easily removable from substage; Abbe condenser removable from optical axis by a double swing movement to one side releasing upper iris diaphragm for use; lower iris diaphragm adjustable laterally by rack and pinion for oblique illumination, revolvable about its own axis and mounted on a swinging arm, allowing it to be swung entirely out of the optical axis.

**Finish**—Main parts, including body tube, in alcohol proof black; adjustment heads and buttons in yellow.

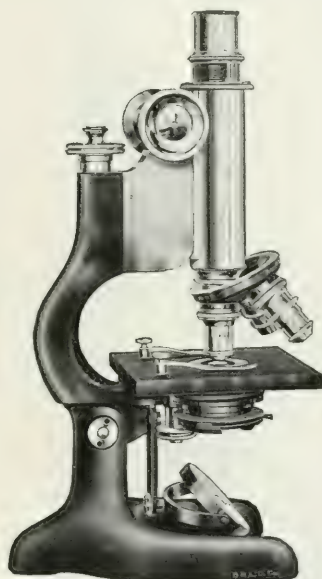
**Case**—Of hardwood with polished finish; fitted with brass lock and key.

Objectives							
Outfit	Dry		Oil Immersion	Eyepieces	Nosepieces	Abbe Condenser	Price
31664.	DDH1	16 mm 4 mm		7.5 ×		1.20 N. A.	131.00
31668.	DDH2	16 mm 4 mm		7.5 ×	Circular Double	1.20 N. A.	135.00
31672.	DDH3	16 mm 4 mm		5 × 10 ×		1.20 N. A.	132.50
31676.	DDH4	16 mm 4 mm		5 × 10 ×	Circular Double	1.20 N. A.	136.50
31680.	DDH8	16 mm 4 mm	1.9 mm	5 × 10 ×	Circular Triple	1.20 N. A.	165.00
31681.	Plain Vulcanite Stage for DDH, interchangeable with					the Revolving Mechanical Stage.	15.00



No. 31696-F4  
with stage iris diaphragm

The F and FF Microscopes embody all the advantages of the Lever Fine Adjustment combined with the Curved Arm.



No. 31700-FF8  
with regular quick-acting screw substage

**MICROSCOPE, BAUSCH & LOMB CURVED ARM TYPE F & FF.** This Microscope is the latest development of the handle arm type with lever fine adjustment and is preferred by many to the BH type because of the facility and safety with which the arm of the microscope may be grasped by the whole hand and because of the large amount of space available for manipulation of the object on the stage.

**Body Tube**—Provided with society screw thread; standard sized eyepieces are used (23 mm diam.); draw tube graduated in single millimeters with every tenth line numbered, adjustable in cloth lined sleeve or in metal fitting, if so specified, and provided with society screw thread for the use of low power objectives.

**Focusing Adjustment**—Coarse adjustment by standard rack and pinion, provided with stop to prevent pinion from overriding rack; fine adjustment of Bausch & Lomb original lever type with two-sized knurled head for slow and rapid movement, ceasing to operate when objective touches the slide; adjustment head locked to prevent removal; all parts of fine adjustment thoroughly dust-proof.

**Stage**—of metal, completely covered with vulcanized rubber except at point of attachment; measures 102 x 102 mm, with a distance of 76 mm from center to arm at stage surface (distance from optical center to extreme inner curve of arm, 85 mm); provided with spring clips. In the F1 to F4 outfits the stage is provided with an iris diaphragm with mount having screw threads for attaching a substage ring to hold an Abbe condenser; iris diaphragm controlled by knurled ring, operated from any point of its circumference; stage attached to arm on broad bearing surface to insure maximum rigidity.

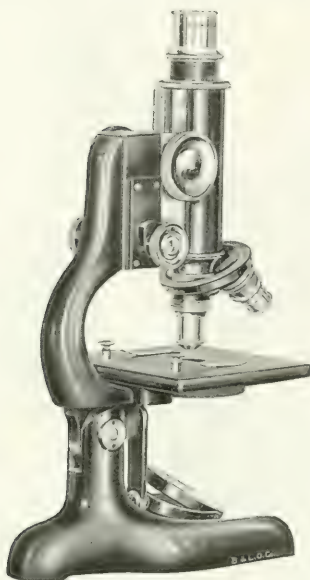
**Finish**—Main parts including body tube in alcohol proof black, adjustment heads in yellow.

**Case**—Of hard wood with polished finish; fitted with brass lock and key.

**Substage**—of FF6 and FF8—adjustable for focus by a quick-acting screw; consists of a mounting for the Abbe condenser and an iris diaphragm, which comes into the plane of the stage when the screw is turned up as far as possible, allowing the condenser to be used in immersion contact with the slide; condenser is provided with iris diaphragm beneath, thus giving two iris diaphragms with equipment; sub-stage is swung to the left of the optical axis when screw reaches the limit of motion downward; iris diaphragm is automatically locked against closing when condenser is in position.

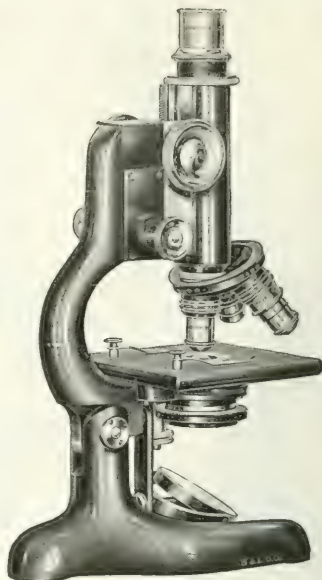
	Outfit	Objectives		Eyepieces	Nosepieces	Abbe Condenser	Price
		Dry	Oil Immersion				
31684.	F1	16 mm	4 mm	7.5 ×			27.50
31688.	F2	16 mm	4 mm	7.5 ×	Circular Double		31.50
31692.	F3	16 mm	4 mm	5 × 10 ×			29.00
31696.	F4	16 mm	4 mm	5 × 10 ×	Circular Double		33.00
31698.	FF6	16 mm	4 mm	5 × 10 ×	Circular Double	1.20 N. A.	41.00
31700.	FF8	16 mm	4 mm	1.9 mm 5 × 10 ×	Circular Triple	1.20 N. A.	65.00

**Note**—Microscopes F1 to F4 can be furnished with a substage ring and Abbe condenser, 1.20 N. A. in an iris diaphragm mounting at an additional cost of \$7.50. In the FF6 and FF8 outfits the sub-stage furnished is the regular quick-acting screw type. The above are the outfits regularly supplied. Prices on special outfits quoted on application.



No. 31708 FS2  
with stage iris diaphragm

These Microscopes offer the combined advantages of the Lever Fine Adjustment with the Side Wheel and Curved Arm



No. 31724 FFS8  
with regular quick acting screw substage

**MICROSCOPE, BAUSCH & LOMB CURVED ARM TYPE FS AND FFS with Lever Side Wheel Fine Adjustment.** This is a new microscope with side fine adjustment of the lever type, which is here used in conjunction with the curved arm made by Bausch & Lomb for many years. The principle is that of their original lever type of fine adjustment which has met the test of time and has been very generally adopted. The construction is simple and durable, giving a delicate movement for work with the highest powers, yet rapid enough for the lower powers. There is absolutely no tendency to wedge, and the adjustment has been tested in a manner equivalent to many years of use without showing wear or lost motion. This adjustment produces a vertical movement of the body tube of 0.25 mm for every complete rotation of the heads. It can be operated from either the right or left side of the arm, a turn of the fine adjustment heads always moving the body tube in the same direction, up or down, as a corresponding turn of the coarse adjustment heads. Positive stops denote the upper and lower limits of motion, and the adjustment ceases to operate when the objective comes in contact with the slide. An automatic take-up for wear is provided.

**Body Tube**—Provided with society screw thread; standard size eyepieces are used (23 mm diam.); draw tube graduated in single millimeters with every tenth line numbered, adjustable in lined sleeve or in metal fitting, if so specified, and provided with society screw thread.

**Focusing Adjustments**—Coarse adjustment by standard rack and pinion; fine adjustment of the lever type, with micrometer head on each side of arm; one complete revolution of the micrometer heads produces a vertical movement of the body tube of 0.25 mm.

**Stage**—Of metal, completely covered with vulcanized rubber except at point of contact with arm; measures 102 x 102 mm, with a distance of 76 mm from center to arm at stage surface (distance from optical center to extreme inner curve of arm, 83 mm); provided with spring clips. In the FS1 to FS4 Outfits the stage is provided with an iris diaphragm with mount having screw threads for attaching a substage ring to take an Abbe Condenser; the iris diaphragm being controlled by a knurled ring operated from any point of its circumference. With mechanical stage No. 32308 the entire surface of a slide, 30 x 75 mm, can be examined.

**Substage of FFS6 and 8**—Adjustable for focus by a quick-acting screw; consists of a mounting for the Abbe condenser and an iris diaphragm, which comes into the plane of the stage when the screw is turned up as far as possible, allowing the condenser to be used in immersion contact with the slide; substage is swung to the left of the optical axis when screw reaches the limit of motion downward; iris diaphragm is automatically locked against closing when condenser is in position, or against inserting condenser when upper iris is closed.

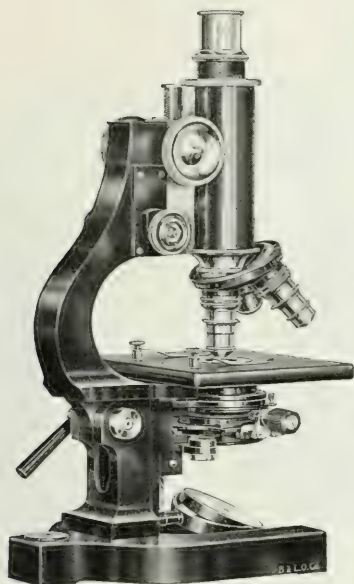
**Mirror**—Plane and concave, 50 mm in diameter; adjustable in two planes in a fork, mounted on a swinging arm provided with a stop for central illumination.

**Finish**—Lower parts, arm and body tube in alcohol-proof black; other parts in yellow.

**Case**—Of hard wood with polished finish; fitted with brass lock and key.

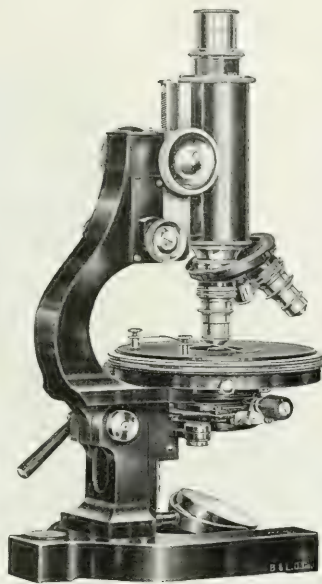
	Outfit	Objectives		Eyepieces	Nosepiece	Abbe Condenser	Price
		Dry	Immersion				
31704.	FS1	16 mm, 4 mm		7.5 x			30.00
31708.	FS2	16 mm, 4 mm		7.5 x	Circular Double		34.00
31712.	FS3	16 mm, 4 mm		5 x 10 x			31.50
31716.	FS4	16 mm, 4 mm		5 x 10 x	Circular Double		35.00
31720.	FFS6	16 mm, 4 mm		5 x 10 x	Circular Double	1.20 NA	43.50
31724.	FFS8	16 mm, 4 mm	1.9	5 x 10 x	Circular Triple	1.20 NA	67.50

Note.—Microscope FS1 to FS4 can be furnished with a substage ring with Abbe Condenser of 1.20 NA at an extra cost of \$7.50. Outfits FFS6 and FFS8 are provided with regular quick acting screw substage.



No. 31744 CASS  
With Complete Substage

These Microscopes offer the combined advantages of the Lever Fine Adjustment with the Side Wheel and Curved Arm.



No. 31764 CCS8  
With Complete Substage

**MICROSCOPES, BAUSCH & LOMB CURVED ARM TYPES CAS AND CCS with Lever Side Wheel Fine Adjustment.** These models are of the size and general construction of CAH and CCH and combine with these features the curved arm with lever side wheel fine adjustment as introduced in types FS and FFS.

**Base and Pillar**—Same as in CAH.

**Arm**—Long curved form of rectangular cross section with rounded edges.

**Body Tube**—Same as in CAH.

**Focusing Adjustment**—Coarse adjustment by rack and pinion; fine adjustment of new side wheel lever type with micrometer head on each side of arm, with drums graduated to read single microns of vertical movement. Index lines are provided on side of arm to show upper and lower limits of fine adjustment range.

**Stage of CAS**—Of metal covered with vulcanized rubber, 125 x 115 mm with a distance of 87 mm from center to base of arm. With spring clips.

**Stage of CCS**—Circular revolving, 125 mm diameter, with vulcanite top, centering screws and spring clips. Distance from center of stage to base of arm 87 mm. Interchangeable with large revolving mechanical stage.

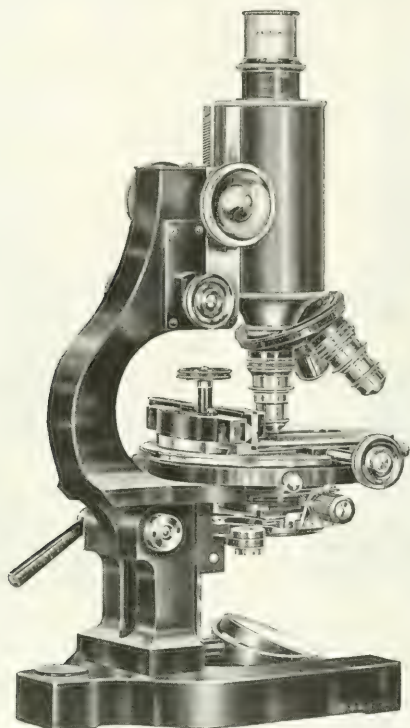
**Substage**—Complete substage equipment with Abbe Condenser, as supplied with CAH, DDH, DHS, etc.

**Finish**—Main parts, including body tube, in alcohol proof black. Adjustment heads in yellow lacquer.

**Case**—Of hardwood with polished finish. With brass lock and key.

	Outfit	Objectives		Eyepieces	Nosepieces	Abbe Condenser	Price
		Dry	Oil Immersion				
31728.	CAS1	16 mm	4 mm	7.5×		1.20 N. A.	72.00
31732.	CAS2	16 mm	4 mm	7.5×	Circular Double	1.20 N. A.	76.00
31736.	CAS3	16 mm	4 mm	5× 10×		1.20 N. A.	73.50
31740.	CAS4	16 mm	4 mm	5× 10×	Circular Double	1.20 N. A.	77.50
31744.	CASS	16 mm	4 mm	1.9 mm 5× 10×	Circular Triple	1.20 N. A.	106.00
31748.	CCS1	16 mm	4 mm	10×		1.20 N. A.	82.00
31752.	CCS2	16 mm	4 mm	10×	Circular Double	1.20 N. A.	86.00
31756.	CCS3	16 mm	4 mm	5× 10×		1.20 N. A.	83.50
31760.	CCS4	16 mm	4 mm	5× 10×	Circular Double	1.20 N. A.	87.50
31764.	CCS8	16 mm	4 mm	1.9 mm 5× 10×	Circular Triple	1.20 N. A.	116.00





No. 31784—DDS With Revolving Mechanical Stage and Complete Substage

**MICROSCOPE, BAUSCH & LOMB CURVED ARM TYPE DDS with Lever Side Wheel Fine Adjustment.** This Microscope is in size and finish identical with DDH but is here combined with the curved handle arm and lever side wheel fine adjustment previously introduced in FS and FFS. This Microscope, like the DDH, is provided with large body tube for photo-micrography and large revolving mechanical stage and is particularly designed for advanced work in research.

**Base**—Horse-shoe form; extra large.

**Pillar**—Double rectangular in section; provided with inclination joint and clamping lever to secure instrument in any position, and with stops in the vertical and horizontal positions.

**Arm**—Long, curved form, providing maximum space for manipulation of object.

**Body Tube**—Of brass, 50 mm outside diameter; provided with society screw thread; standard size eyepieces are used; draw tube graduated in single millimeters with every tenth line numbered, adjustable in cloth-lined sleeve, or in metal fitting, if so specified, and provided with a society screw thread; lower collar may be removed for attaching the Micro-Tessar, 72 mm objective.

**Focusing Adjustment**—Coarse adjustment by rack and pinion; fine adjustment of lever type, with micrometer head on each side of arm, one with drum graduated to read  $2\frac{1}{2}$  microns of vertical movement of body—index lines are provided on side of arm to show upper and lower limits of fine adjustment range.

**Stage**—Large mechanical, with centering heads; revolvable with clamping device to prevent rotation when desired; diameter 125 mm with a distance of 87 mm from its center to the base of arm, provided with two rack and pinion movements, covering a range of 75 mm and 50 mm respectively to make possible the examination of 3 in. x 2 in. slide from corner to corner; upper part of stage may be removed, leaving a large flat surface with one rack movement; entire mechanical stage removable for substitution of a plain revolvable stage.

**Substage**—Complete with swing-out condenser and so arranged that all substage accessories, inserted into the upper sleeve, may be easily employed; adjustable by standard rack and pinion; upper iris diaphragm of dome shape, self-locking, combined with Abbe condenser, the whole easily removable from substage; Abbe condenser removable from optical axis by a double swing movement to one side, releasing upper iris diaphragm for use; lower iris diaphragm adjustable laterally by rack and pinion for oblique illumination, revolvable about its own axis and mounted on a swinging arm, allowing it to be swung entirely out of the optical axis.

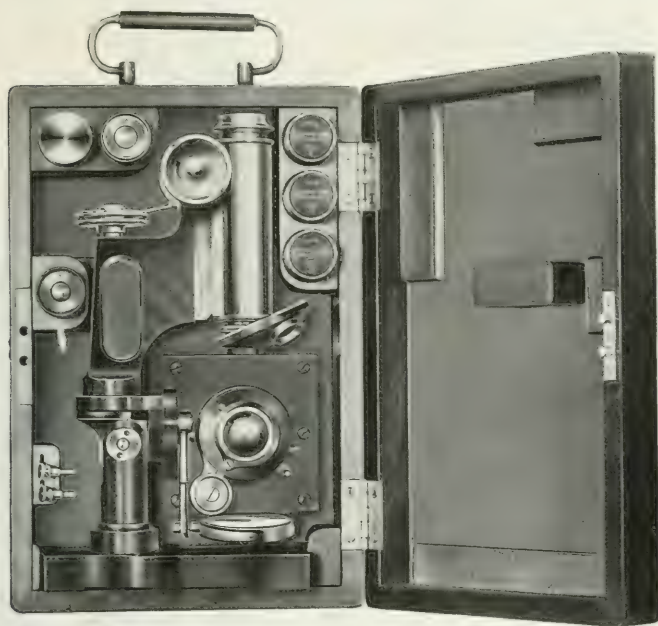
**Mirror**—Plane and concave, 50 mm in diameter; adjustable in a fork, attached in fixed position to substage support.

**Finish**—Main parts, including body tube, in alcohol proof black; adjustment heads in yellow.

**Case**—Of hard wood with polished finish; fitted with brass lock and key.

## Objectives

	Outfit	Dry		Oil Immersion	Eyepieces	Nosepieces	Abbe Condenser	Price
31768.	DDS1	16 mm	4 mm		7.5X	Circular Double	1.20 N. A.	120.00
31772.	DDS2	16 mm	4 mm		7.5X		1.20 N. A.	124.00
31776.	DDS3	16 mm	4 mm		5X 10X	Circular Double	1.20 N. A.	121.50
31780.	DDS4	16 mm	4 mm		5X 10X		1.20 N. A.	125.50
31784.	DDS8	16 mm	4 mm	1.9 mm	5X 10X	Circular Triple	1.20 N. A.	154.00



No. 31804—BHP8 in Case



No. 31808

**MICROSCOPE, BAUSCH AND LOMB PORTABLE TYPE BHP.** This microscope is of the same general construction as the BBH but with folding stage and base to permit of convenient insertion in a small carrying case. It has been widely used for field work notably by the Rockefeller Sanitary Commission for the Eradication of the Hookworm to which we have supplied many instruments.

**Base**—V shaped, with hinge to permit parts to be folded together; stable with microscope at full inclination.

**Focusing Adjustment**—Coarse adjustment by standard rack and pinion; fine adjustment of Bausch & Lomb lever type with double knurled micrometer screw head for slow and rapid movement, the larger part graduated into 100 divisions, each equal to .005 mm in vertical movement, and provided with a hinged indicator, which may be turned back from the head; fine adjustment ceases to operate when objective touches the slide.

**Stage**—Of blackened metal, with vulcanized rubber top, measures 98 x 88 mm with a distance of 58 mm from its center to base of arm; provided with spring clips, mounted on a joint with clamp, permitting it to be turned in a vertical position for placing it in case and yet to be rigid when in a horizontal position for use.

**Substage**—Adjustable for focus by a quick acting screw; consists of a mounting for the Abbe condenser and an iris diaphragm, which comes into the plane of the stage when the screw is turned up as far as possible, allowing the condenser to be used in immersion contact with the objective, if desired; substage is swung to the left of optical axis when screw reaches the limit of motion downward.

**Finish**—Main parts including body tube in alcohol proof black, adjustment heads in yellow.

**Case**—Of hard wood with polished finish; fitted with brass lock and key; outside dimensions, 284 x 192 x 83 mm (11 1/4 x 7 1/2 x 3 1/4 in.).

**Weight**—In carrying case, 10 lbs., 13 ozs.

#### Objectives

	Output	Dry	Oil Immersion	Eyeieces	Nosepieces	Abbe Condenser	Price
31800.	BHP4	16 mm 4 mm		5 x 10 x	Circular Double		56.50
31804.	BHP8	16 mm 4 mm	1.9 mm	5 x 10 x	Circular Triple	1.20 N. A.	92.50

**MICROSCOPE, BAUSCH AND LOMB DEMONSTRATION TYPE O.** This instrument enables an instructor to supplement his lecture work by showing a single object to an entire class. He has only to adjust the slide, focus the instrument and pass it around the class, the students pointing it to the light to make the observations. We have supplied this instrument also to a number of industrial establishments, such as manufacturers of safety razor blades for the convenient examination by workman of delicate parts during manufacture.

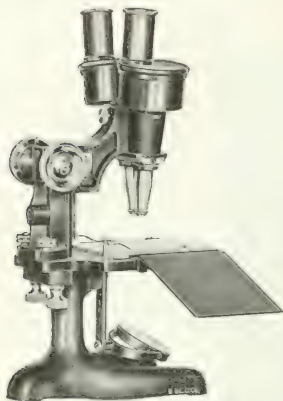
**Arm**—Handle type, of ample size.

**Stage**—Of blackened metal, 100 x 83 mm, giving a distance of 42 mm from its center to arm, provided with spring clips and with small posts underneath to hold the instrument in a vertical position when not in use.

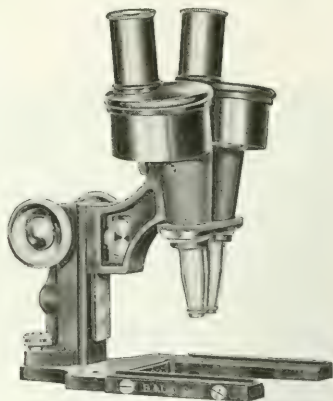
**Focusing Adjustment**—Body tube slides in a cloth-lined spring tube; when properly focused, it may be secured by a small set screw above the handle.

**Body Tube**—Fixed length, 160 mm; provided with society screw for regular microscope objectives; standard sized eyeieces are used.

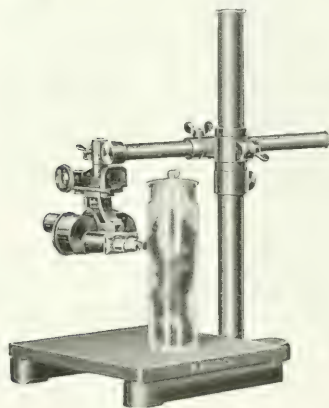
	Output	Objectives Dry	Eyeieces	Price
31808.	O		7.5 x	6.00
31812.	O <sub>i</sub>	16 mm	7.5 x	11.00



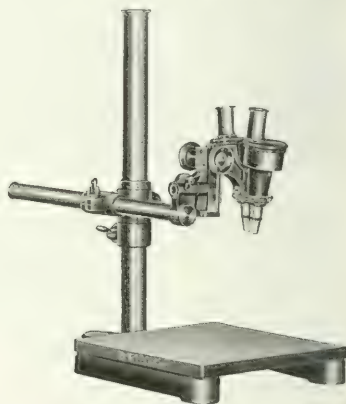
No. 31816—With paired objective in position



No. 31816—With base and stage, glass removed



No. 31821—With body tube arranged horizontally



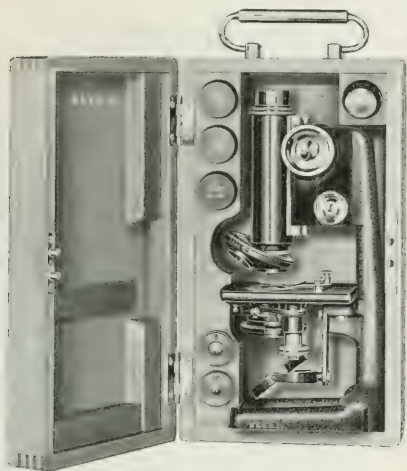
No. 31824—With body tube arranged vertically

# **MICROSCOPE, BAUSCH & LOMB BINOCULAR, with image erecting prisms, paired oculars and objectives.**

The body tube with prisms is similar to that used in the Zeiss Binocular and the eye-pieces are adjustable for inter-pupillary distance. The base is readily removable as is the glass part of the stage in which arrangement the instrument may be used for a variety of purposes. The distinct improvement in this model is in the construction of the arm which permits the detaching of the curved portion from the sliding piece which carries the rack and also from the body tube proper. These features permit the quick increasing or decreasing of the working distance and also the almost universal application of the binocular body when used in connection with the large preparation stand and support. The stand for large preparations consists of a heavy base of horse-shoe form with a removable wooden stage.

31816.	Microscope, Binocular, as above, stand only with hand rests but without oculars or objectives, in case.....	45.00			
31820.	Support for Large Preparations, without binocular body tube.....	18.00			
31824.	“ “ “ “ with binocular body tube, without objectives or oculars but with case for binocular body tube.....	53.00			
31828.	Paired Objectives, for Bausch & Lomb Binocular Microscope.				
	Equivalent focus, mm.....	55	48	40	32
	Each.....	11.00	11.00	12.00	12.00
31832.	Paired Oculars, for Bausch & Lomb Binocular Microscope.				
	Power.....	5×	6.4×	7.5×	10×
	Equivalent focus, mm.....	50	40	33	25
	Each.....	3.00	3.00	3.00	3.00

**NEW BAUSCH & LOMB MICROSCOPES AND ACCESSORY APPARATUS**  
which were not ready for announcement at the time our catalogue went to press.

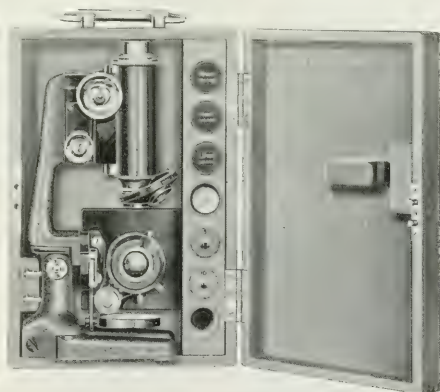


No. 31791

**Microscope, Bausch & Lomb New Portable Type APS,** as originally designed for field use by the International Health Commission in their work in the tropics. The fine adjustment is of the new side wheel lever type with micrometer head on each side of arm and exactly as described for Microscopes FS, FFS, etc. (see page 308). The stage remains in a horizontal position when the Microscope is put in the case, is covered with vulcanized rubber and measures 92 x 76 mm with a distance of 62 mm from center to base of arm. In the No. 8 outfit the regular quick acting screw substage with Abbe condenser and iris diaphragm is provided. Outfits APS 1, 2, 3 and 4 are not provided with the substage and Abbe condenser. They can be fitted with a substage ring with Abbe condenser and lower iris diaphragm at an additional cost of \$7.50. The two arms of the base fold inward on their own centers in the position as shown in illustration when the Microscope is put into the case. The weight of the No. 8 outfit, complete in polished hardwood case as shown in illustration, is 9 lbs., 8 oz., and the external dimensions of the case are 11½ x 6¾ x 4½ inches.

	Outfit	Objectives		Eyepieces	Nosepieces	Abbe Condenser	Price
		Dry	Oil Immersion				
31786.	APS 1	16 mm	4 mm	7.5 x			27.50
31788.	APS 2	16 mm	4 mm	7.5 x	Circular Double		31.50
31790.	APS 3	16 mm	4 mm	5 x 10 x			29.00
31792.	APS 4	16 mm	4 mm	5 x 10 x	Circular Double		33.00
31794.	APS 8	6 mm	4 mm	1.9 mm	5 x 10 x	Circular Triple	1.20 N. A. 70.00

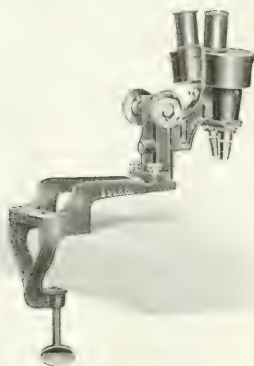
**Microscope, Bausch & Lomb New Portable Type BPS.** This Microscope differs principally from the preceding Type APS in that the folding base is provided with a hinged heel giving additional stability to the Microscope at full inclination and folding under when the Microscope is not in use. The stage also folds from the horizontal position as in use to the vertical position, as shown in the illustration, when the Microscope is put in the case. It is also covered with vulcanized rubber and measures 88 x 88 mm with a distance of 70 mm from center to base of arm. The side wheel fine adjustment is of the lever type previously described and the finish and other construction identical with other Bausch & Lomb standard Microscopes. The particular feature of this equipment is the small size of the case, i.e., 11¼ x 7½ x 3¼ inches, and the light weight of the complete No. 8 outfit, 10 lbs. 5 oz.



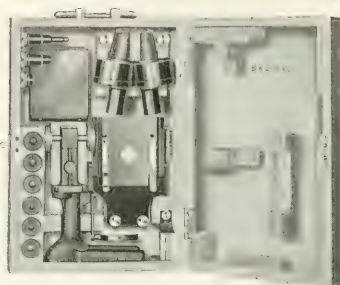
No. 31798

	Outfit	Objectives		Eyepieces	Nosepieces	Abbe Condenser	Price
		Dry	Oil Immersion				
31796.	BPS 4	16 mm	4 mm	5 x 10 x	Circular Double		56.50
31798.	BPS 8	16 mm	4 mm	1.9 mm	5 x 10 x	Circular Triple	1.20 N. A. 92.50





No. 31831a



No. 31835b

**Microscope, Bausch & Lomb New Binocular Type KC**, consisting of binocular body KA with support arm mounted on a special support to clamp on the edge of table. As designed by Prof. J. H. Schaffner, of Ohio State University, for the observation of herbarium sheets. The advantages of this type of support for zoological work have been promptly recognized and the instrument is, therefore, offered complete with new support, and new support only for those who are already provided with the KA Binocular Microscope. The dimensions of the arm permit for working distance up to 195 mm, measuring from the lower edge of the nosepiece to table top. The optical equipment of tubes, etc., is identical with Binocular KA. For additional paired oculars and objectives for use with the binocular tube see page 312.

**31834. Clamp Stand KC 1**, with Microscope body KA without objectives or eyepieces but with case for body. .... 40.00

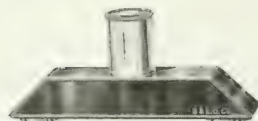
**31831A. Clamp Stand KC 3**, same as above but with paired objectives, 10 mm, and paired eyepieces 10 x 55.00

**31831B. Clamp Stand KC only**. .... 5.00

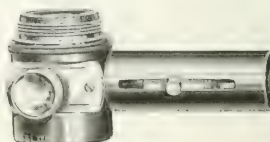
**31834C. Glass Plate**, heavy, square, with ground edges, 300 x 300 mm. .... 1.25

**Microscope, Bausch & Lomb New Portable Binocular Type KP**. This is a binocular of the Gruehn type exactly as described on page 312 but specially arranged for portability in that the binocular body and stage are completely detachable from the base which is provided with folding arms as in Portable Microscopes APS and BPS. An extraordinary range of working distance up to 155 mm is provided for measuring from the lower edge of the nosepiece to the stage and the entire supporting arm with body tube can be removed and used on Binocular Microscope Stand KB described on page 312, so that with one set of body tubes both a portable and laboratory outfit of this type KB is possible. The stage is of metal with large rectangular aperture provided with two removable plates 80 x 95 mm, one of metal and the other of transparent glass. The metal stage is provided with a metal plate allowing either clear aperture, white opaque, black opaque or ground glass illumination or background. The No. 5 outfit in carrying case weighs 11 lbs., 12 oz. and the case measures 9 x 13 x 3½ inches.

	Outfit	Paired Objectives	Paired Eyepieces	Price
31835.	KP 1	40 mm	10 x	67.50
31835A.	KP 3	48 mm 32 mm	6.4 x 10 x	81.50
31835B.	KP 5	55 mm 40 mm 24 mm	5 x 7.5 x 10 x	96.50



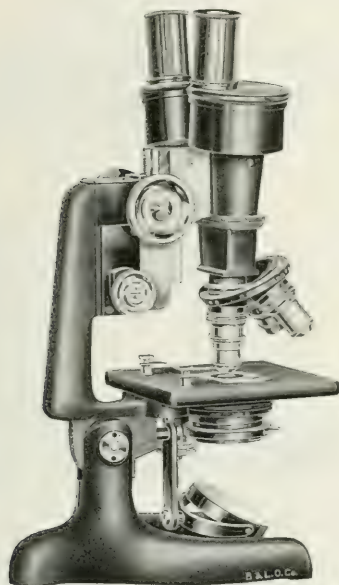
No. 31993



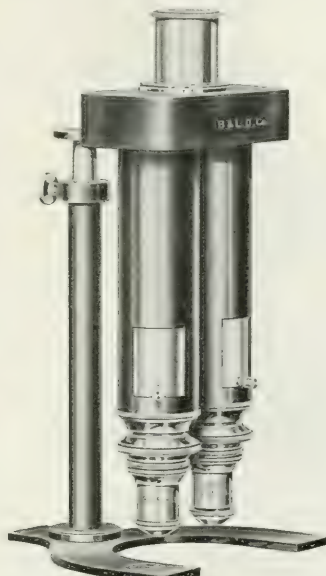
No. 32139

**31993. Comparison Eyepiece, Bausch and Lomb**, as suggested by Dr. Daniel J. Healy, of the Kentucky Agricultural Experiment Station, for the observation of two different objects side by side in the same field. The field is divided horizontally into halves as in the original form after Van Heurck in 1886 for comparing diatoms. Any two Microscopes with regular size draw tubes may be used. .... 25.00

31994. **Pointer Eyepiece**, 10 x, with pointer for indicating special features in the field. Pointer is controlled by a small external lever..... 2.75
31995. **Diaphragm**, with projecting hair, for use with above, as suggested by Dr. W. J. G. Land, of the University of Chicago. May be also inserted in any regular standard eyepiece..... .50
32139. **Vertical Illuminator**, with two small square mirrors in place of the usual plane glass reflector and with a side tube carrying a condensing lens adjusted for focusing at light source. Two sizes of lenses are provided for interchangeable use, one for high and the other for low powers..... 12.00



No. 31835H



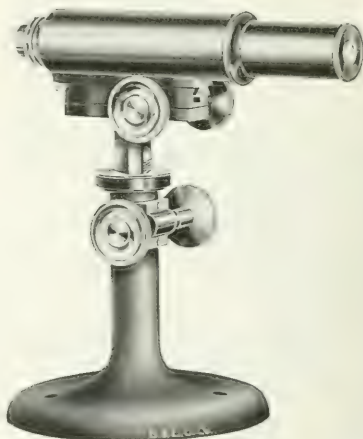
No. 24900

**Microscope, Bausch & Lomb New Binocular Type KD**, consisting of binocular body tube KA of the Greenough type with a special prism system added which makes possible the use of any of the achromatic objectives up to 1.9 mm oil immersion. When a single objective is used one image merges with the other and the subject is seen erect and not transposed. Stereoscopic effect is obtained by suitable adjustment of the pupillary distance. The removal of the prism system with nosepiece and regular achromatic objectives as shown in illustration permits the use of the same stand and body tubes with the regular paired objectives as supplied with Binocular Microscope KA. The focusing adjustment is of the side wheel lever type and the stage measures 102 x 102 mm with distance of 85 mm from center of arm at stage surface. Finish and construction otherwise identical with Bausch & Lomb standard. For prices of paired objectives used on this stand see page 312.

	Outfit	Objectives		Paired Eyepieces	Nosepiece	Abbe Condenser	Price
		Dry	Oil Immersion				
31835C.	<b>KD</b>			7.5 x			78.00
31835D.	<b>KD 1</b>	16 mm	4 mm	7.5 x			91.00
31835E.	<b>KD 2</b>	16 mm	4 mm	7.5 x	Circular Double		95.00
31835F.	<b>KD 3</b>	16 mm	4 mm	5 x 10 x			94.00
31835G.	<b>KD 4</b>	16 mm	4 mm	5 x 10 x	Circular Double		98.00
31835H.	<b>KD 8</b>	16 mm	4 mm	1.9 mm 5 x 10 x	Circular Triple	1.20 N. A.	134.00
24900.	<b>Color Comparison Microscope, Bausch &amp; Lomb</b> , as suggested by Albert S. Osborn for the examination of questioned documents but useful for a great variety of other comparison work both with and without the use of Lovibond tint glasses for the determination of color values. This Microscope is regularly furnished with two 48 mm objectives and one 10 x Ramsden eyepiece. The fine adjustment is provided at the nosepiece by the rotation of a milled ring. The Lovibond or other standard tint glasses are inserted in the slots in the body tube and are not included in the price of the outfit.....						
							55.50



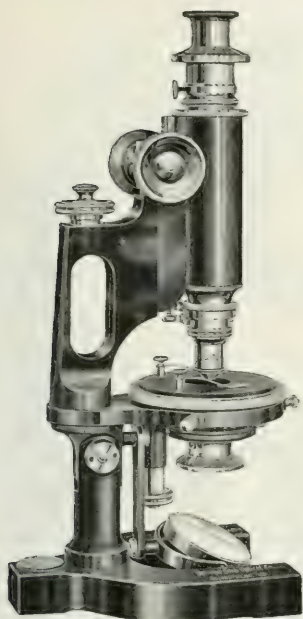
No. 31309



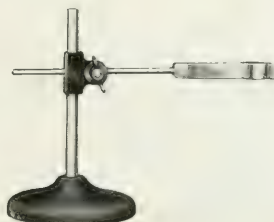
No. 31268

**Microscope, Metallurgical, Bausch and Lomb New Type AM.** This Microscope is of the general type of the F model but is provided with a focusing stage and a special arm for convenient use in metallurgical work. The design is that of Dr. Albert Sauveur, of Harvard University, and the Microscope is provided with regular vertical illuminator No. 32136. The objectives listed are those in regular mounts. If desired in special short mounts \$1.00 extra for each objective is added.

	Outfit	Objectives Dry	Eyepieces	Vertical Illuminator	Price	
31309.	AM 1	16 mm 4 mm	7.5 x	No. 32136	49.50	
31310.	AM 2	16 mm 4 mm	5 x 10 x	No. 32136	51.00	
31269.	<b>Microscope, Measuring, Bausch &amp; Lomb</b> , for reading the rate of fall of the leaf of an electroscope, the height of a mercury column, or for any other readings where precision is required. With 32 mm achromatic objective and Ramsden ocular giving a magnification of 20 diameters. The ocular is provided with a 12 mm scale graduated in tenths of a millimeter with every millimeter line longer than the rest and numbered.....					35.00
31270.	<b>Microscope Tube</b> , only, for above, without adjustable base or rack and pinion focusing adjustment.					15.00
33072.	<b>Micro Slide Cabinet, Bausch &amp; Lomb</b> , exactly as described under No. 33072 on page 336 but holding 6000 slides, consisting of 300 trays in three tiers, with two glass paneled doors. Dimensions 95 cm high, 86 cm wide and 34 cm deep.....					125.00
31974.	<b>Objective, Bausch &amp; Lomb New 1.9 mm Immersion</b> . This is a new system of 1.32 N. A. in which a considerable reduction of the secondary spectrum, and with this a greater refinement in definition, has been secured. It has a working distance of 0.13 mm and micrometer value with a 6.4 x eyepiece of 0.0016 = 1.5 $\mu$ .....					35.00
32870.	<b>Micro Lamp, Bausch &amp; Lomb New Tungsten Electric</b> . This is exactly similar in appearance and method of mounting to the Nernst Lamp listed on page 331 under No. 32868 which, with the announcement of the new Tungsten, has been discontinued. This lamp is furnished with frosted globe and furnishes a light sufficient for regular microscopic work as well as for dark ground illumination. For either 110 or 220 volts alternating or direct current. Please specify voltage in ordering. On adjustable stand with cord and plug.....					5.00
32065.	<b>Ocular Micrometer Disc</b> , ruled to 5 mm in 0.05 mm divisions with every twentieth line numbered.					1.50
32066.	<b>Ocular Micrometer Disc</b> , ruled to 10 mm in 0.1 mm divisions with every tenth line numbered....					2.00



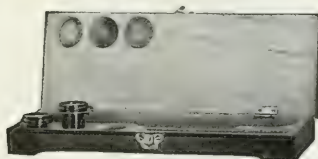
No. 31844



No. 31852



No. 31848



No. 31848—Showing base opened

**MICROSCOPE, BAUSCH AND LOMB CHEMICAL TYPE M.** Constructed after the specifications of Dr. E. M. Chamot of Cornell University, and is designed for work in all branches of Micro-Chemistry and in commercial laboratories, being admirably adapted for the examination of foods and drugs as well as chemicals. High power objectives may be used with it, but a small cover glass should be cemented with pure glycerine to the front of even low powers to prevent damaging from contact with reagents. Bausch & Lomb quick changing nosepiece is regularly listed with this instrument, as it is desirable under ordinary conditions to have but one objective on the stand at once. The instrument is of the Handle Arm Type with lever fine adjustment similar in appearance to the BBH except for the revolving stage.

**Stage**—Circular revolving with knurled edge, graduated on circumference in single degrees, with every tenth line numbered, and read by a conveniently placed pointer; measures 88 mm outside and 78 mm inside graduations, with a distance of 58 mm from center to base of arm; has vulcanite top and is provided with spring clips and centering screws.

**Analyzer**—Consists of a Thompson prism mounted in a revolving collar graduated in two-degree divisions with every tenth line numbered; collar revolves smoothly in cylindrical mounting fitting over draw tube and is slotted to engage stud for zero point; can be easily removed for insertion of microscope eyepiece.

**Polarizer**—Consists of a high grade Nicol prism mounted with a revolving ring graduated in two-degree divisions, with every tenth line numbered, and having an indicating pointer; entire mounting securely supported in substage and fixed for zero point by stud which engages corresponding slot.

**Finish**—Entire instrument neatly finished in durable black.

**Case**—Of hard wood with polished finish; fitted with brass lock and key.

	Outfit	Objectives	Dry	Cross Hair Eyepieces		Quick Changing Nosepieces	Price
31836.	M 1	16 mm	8 mm	10 ×	15 ×		84.00
31840.	M 2	16 mm	8 mm	10 ×	15 ×	With Two Rings	90.65
31844.	M 4	32 mm	16 mm	8 mm	$\left\{ \begin{array}{l} 5 \times \\ 10 \times \end{array} \right.$ $\left\{ \begin{array}{l} 7.5 \times \\ 15 \times \end{array} \right.$	With Three Rings	100.00

31848. **Microscope, Dissecting, Barnes**, consisting of a block of wood neatly finished and made in a shape forming hand rests; with hinged base providing a case for accessories. Stage is of glass 80 x 70 mm, removable, and with black and white plate supplied for use as opaque background; distance from center of post to center of lens 50 mm. While Doublet lenses are supplied with the regular outfits listed below any of the regular magnifiers such as Coddington, Triple Aplanat and Hastings will fit the lens holder.

Number of Doublets..... 1 2  
Each..... 2.50 3.25

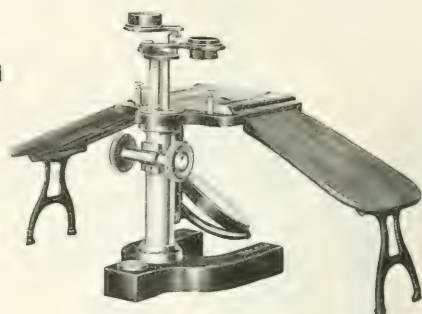
31852. **Lens Holder, Type TU**, consisting of a one piece lens arm with spring clamp taking any magnifier not more than 38 mm in diameter, all mounted on heavy metal base; distance from center of post to center of lens 205 mm, adjustable in all directions..... 3.00

31856. **Lens Holder, Type TUS**, consisting of jointed lens arm on triangular post, with rack and pinion, distance from center of pillar to center of lens 340 mm. Spring clamp will take any lens not over 38 mm in diameter, range of rack work 48 mm. See illustration on following page..... 9.00

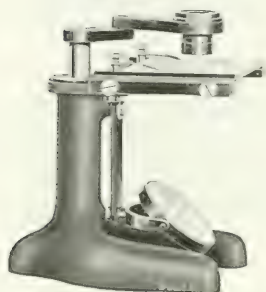




No. 31856 Type U1



No. 31916 Type Y2



No. 31860 Type U1



No. 31888 Type W1

# MICROSCOPES, BAUSCH AND LOMB DISSECTING, TYPES U, W AND Y.

These three types of dissecting Microscopes are supplied in varying outfits as given in the price list below or in special outfits as may be required. The specifications of the stands are as follows with a list of regular equipment and prices:—

- Type U.** **Focusing Adjustment**—By means of sliding post in pillar, with knot; range, 47 mm.  
**Stage**—Glass, 80 x 66 mm, removable, second set of grooves beneath stage for black and white metal plate, supplied for use as opaque background; spring clips attached to stage support; hand rests may be attached to edges of support.  
**Type W.** **Focusing Adjustment**—By standard rack and pinion, with a knurled head on either side, giving a range of 60 mm.  
**Hand Rests**—Of metal, neatly covered with leatheret, 95 mm in length and detachable.  
**Lens Arm**—Jointed so that entire field of stage can be covered; maximum distance from center of pillar to center of lens, 90 mm; arm may be removed for substitution of erecting body; extra removable support provided for attachment of Abbe Camera Lucida, which may be raised or lowered to get full field of view.  
**Type Y.** **Focusing Adjustment**—By standard rack and pinion, with knurled head on either side; range, 60 mm.  
**Stage**—Plate glass, 90 x 80 mm, removable; second set of grooves beneath stage for black and white metal plate, supplied for use as opaque background; extra long, spring clips attached to stage support; holes for hand rests in edges of stage support.  
**Hand Rests**—Mahogany, 160 mm long, attached to edges of support and steadied by metal frames; detachable but included in outfits.

		Lenses						
	Outfit	Focal Lengths			Formulae	Camera Lucida	Price	
31860.	U 1	25 mm			Doublet		6.75	
31864.	U 2	38 mm	19 mm		Doublet		7.50	
31868.	U 3	25 mm			Coddington		7.25	
31872.	U 4	38 mm	19 mm		Coddington		8.50	
31876.	U 5	25 mm			Triple Aplanat		9.50	
31880.	U 6	25 mm	13 mm		Triple Aplanat		13.00	
31884.	H R	Metal Hand Rests for Type U per pair—					.75	
31888.	W 1	25 mm			Doublet		9.00	
31892.	W 2	38 mm	19 mm		Doublet		9.75	
31896.	W 3	25 mm			Coddington		9.50	
31900.	W 4	38 mm	19 mm		Coddington		10.75	
31904.	W 5	25 mm			Triple Aplanat		11.75	
31908.	W 6	25 mm	13 mm		Triple Aplanat		15.25	
31912.	Y 1	25 mm			Doublet		17.00	
31916.	Y 2	38 mm	19 mm		Doublet		17.75	
31920.	Y 3	25 mm			Coddington		17.50	
31924.	Y 4	38 mm	19 mm		Coddington		19.00	
31928.	Y 5	25 mm			Triple Aplanat		19.75	
31932.	Y 6	34 mm	17 mm		Triple Aplanat		23.25	
31936.	Y 7	38 mm			Hastings Triplet		31.25	
31940.	Y 8	38 mm			Hastings Triplet	Abbe No. 32044	41.25	



No. 3196



No. 32016



No. 32028

**MICROSCOPE ACCESSORIES, BAUSCH AND LOMB.**

**Objectives**—The 4 mm ( $\frac{1}{4}$  in.) objective is supplied in two types of different N. A. The 0.65 N. A. is distinguished by an extraordinarily long working distance, which enables the objective to focus easily through the thickest cover-glass of the Thoma-Zeiss Haemacytometer.

The 4 mm objective of 0.85 N. A., with less working distance and less depth of focus than the 0.65 N. A. type has the advantage of greater resolving power.

	B and L Catalog Number	Equivalent Focus		Numerical Aperture	Working Distance	Micrometer Values with 6.4 × Ocular	Price
		Millimeters	Inches				
31944.	1005	48	2	0.08	53	0.087 = 87 μ	4.00
31948.	1009	32	1 1/4	0.10	38	0.044 = 44 μ	4.00
31952.	1021	16	1/2	0.25	7.0	0.018 = 18 μ	5.00
31956.	1027	8	5/16	0.50	1.6	0.0055 = 5.5 μ	8.00
31960.	1029	4L	3/8	0.65	0.6	0.0040 = 4.0 μ	8.00
31964.	1031	4S	3/8	0.85	0.3	0.0040 = 4.0 μ	8.00
31968.	1035	3	1/2	0.85	0.2	0.0029 = 2.9 μ	8.00
31972.	1041	1.9	1 1/4	1.30	0.15	0.0018 = 1.8 μ	27.00

**Oculars**—The Huyghenian Oculars are of 23 mm outside diameter and are interchangeable with all modern European oculars such as Zeiss, Leitz, etc. If oculars are ordered for the old American size, i. e., 25 mm outside diameter, this fact must be stated in ordering.

**Approximate Equivalent Focus**

B and L Catalog Number	Magnifying Power	Equivalent Focus		Price
		Millimeters	Inches	
31976.	1100	5 $\times$	2	1.50
31980.	1101	6.4 $\times$	40	1.50
31984.	1102	7.5 $\times$	33	1.50
31988.	1104	10 $\times$	25	1.50
31992.	1106	12.5 $\times$	20	1.50

**Substage Condensers**—The usual Abbe Condensers are neither chromatically nor spherically corrected, but for all ordinary work serve their purpose very well. Their function is to send light through the object under an angle sufficiently large to fill the aperture of the objective with light. They are furnished in two numerical apertures: 1.20 N. A., containing two lenses, and 1.40 N. A. containing three lenses. The Aplanatic Condenser 1.40 N. A., consists of three lenses—an over hemispherical, a meniscus and a double convex, which has a spheroidal surface for correcting the spherical aberration. The spherical correction obtained in this way is of the highest degree and perfect for all zones of the condenser, a result that has not been reached by any other construction. The lenses are separable, and the condenser, with the upper lens removed, gives a numerical aperture of 0.60; with both lenses removed, one of 0.40. The quality of correction in each case is of the same high order as that of the complete combination.

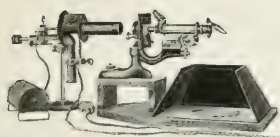
The Achromatic Condensers are corrected for two colors and spherically corrected for two zones. They are recommended for work where it is essential that a sharp image of the light source, free from color fringes, be projected into the plane of the object. The iris diaphragm is located between the lenses.

		Equivalent Focus				Slide Thickness	Price
B and L Catalog Number	Designation	Numerical Aperture	Millimeters	Inches			
31996.	1740	Abbe Condenser	1.20	12.0	1.80	7.50	
32000.	1742	Abbe Condenser	1.40	8.7	0.90	9.00	
32004.	1743	Aplanatic Condenser	1.40	12.0	2.00	22.50	
32008.	4535	Achromatic Condenser	1.00	12.0	1.90	25.00	
32012.	4537	Achromatic Condenser	1.40	13.0	0.90	30.00	
32016.	Dark-Field Condensers—This Condenser is interchangeable with the Abbe Condenser, and can be						

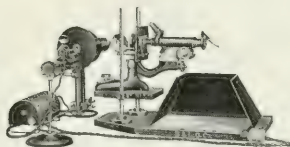
**Dark-Field Condensers**—This Condenser is interchangeable with the Abbe Condenser, and can be applied to any Bausch & Lomb Microscopes fitted with either the screw or the complete substage. It consists of a reflector so constructed that the rays are made to strike the object at oblique angles, corresponding to numerical apertures between 1.00 and 1.40, allowing only those rays to reach the eye which are diffracted by the object. The result is that a dark field is produced in which objects appear brilliantly illuminated. Objectives having numerical apertures between 1.00 and 1.40, such as the oil immersion 1.30 N.A., must be provided with a funnel stop, when used with this condenser, in order to reduce the numerical aperture to less than 1.00. For successful operation a powerful light source is required. See discussion under Micro Lamps. Printed directions are enclosed with each illuminator. In centering mount with iris diaphragm... 11.00

32020.	Funnel Stop for oil immersion objective, when used for dark field.....	40
32024.	Nosepiece, Double, new dust proof form accurately centered and par-focal for 16 mm and 4 mm objectives.....	4.00
32028.	Nosepiece, Triple, accurately centered and par-focal for 16 mm, 4 mm and 1.9 mm objectives.....	5.50





No. 32092



No. 32104



No. 32112-16



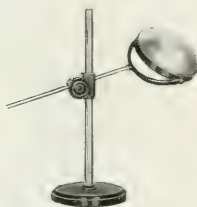
No. 32124



No. 32120



No. 32128



No. 32132



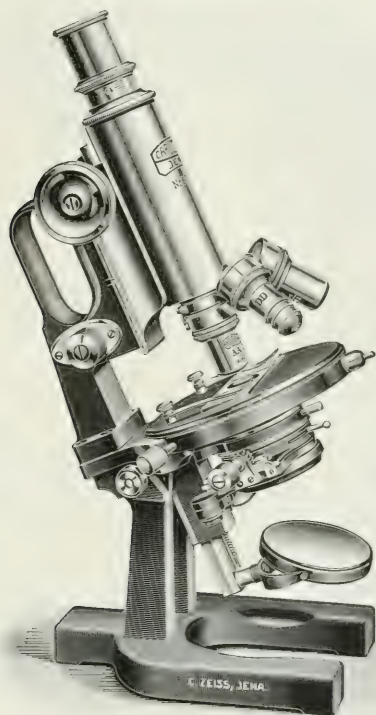
No. 32136

32092. **Micro Drawing Apparatus**, a new and convenient arrangement for the use of an ordinary Microscope in drawing; suitable for use with powers from 50 to 430 diameters. The standard image distance of 10 inches being fixed, the pencil is operated with the eye at its normal reading distance, an important feature where much work is to be done. Outfit includes drawing board, mirror, hand feed arc lamp and rheostat for 110 volts, 4 amperes, with plug and cord but without microscope. . . . 25.00
32096. **Drawing Board**, only, with support for the microscope, clamp and light shield. . . . 3.50
32100. **Mirror**, only, with clamp for draw tube. . . . 2.50
32104. **Micro Drawing Apparatus**, similar to above in operation but with adjustable support for the microscope, permitting alterations of the projection distance between mirror and paper. With drawing board, mirror, hand feed arc lamp and rheostat for 110 volts, 4 amperes, but without microscope. . . . 27.50
32108. **Adjustable Drawing Board**, only, with support for the microscope, clamp and light shield. . . . 6.00
32112. **Polarizer**, for use interchangeably with an Abbe condenser in the substage; with one selenite. . . . 12.00
32116. **Polarizer**, same as No. 32112, but with three interchangeable selenites mounted in metal rings. . . . 15.00
32120. **Analyzer**, for use with either of the above Polarizers for attaching to the microscope immediately above the objective. . . . 10.00
32124. **Analyzer**, for attaching to draw tube above the ocular; with graduated disc to measure angle. . . . 15.00
32128. **Turn-Table**, for ringing mounts and making cells. . . . 4.00
32132. **Bulls-Eye Condenser**, for the illumination of opaque objects and to secure parallel beam from artificial sources of light. On adjustable stand.  
Diameter of lenses, mm. . . . 38 56 75  
Each. . . . 3.00 5.00 7.00
32136. **Vertical Illuminator**, for illuminating opaque objects, particularly metal surfaces; for attaching immediately above the objective. . . . 6.50
32138. **Vertical Attachment**, new form, with bulls-eye condensing lens and iris diaphragm attachment. . . . 15.00

We have found it difficult to comprehensively and clearly present the two makes of Microscopes and Accessories (Bausch & Lomb and Zeiss) in the space at our disposal in this catalogue. We believe those familiar with Microscope equipments will find no difficulty in securing the information necessary to the selection of outfits from the material listed on these pages but we emphasize our desire to send upon application the original catalogues of both Carl Zeiss and Bausch & Lomb Optical Co. with such additional and more specific information as we have gathered in an experience of over twenty years in the sale of Microscopes.







No. 32156—Stand III CA with Triple Nosepiece, Ocular and Objectives

**MICROSCOPE, ZEISS STAND III.** This is the most widely used of the new series of Zeiss Microscopes with handle arm and Berger fine adjustment. It is identical with Stand I with the exception of large body tube and the finish of the base which in Stand III is of crystallized lacquer instead of smooth black. For all ocular observations, therefore, this stand meets the requirements of the most refined investigations but is not recommended for a wide range of use in photo-micrography and micro-projection because of the narrow or standard tube. Special attention is called to the four types of stages furnished as regular equipment with this outfit. With the exceptions above noted this stand is identical in finish and mechanical adjustments to Stand I.

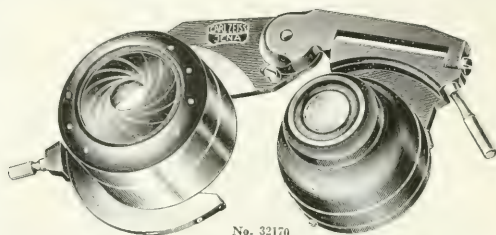
**Fine Adjustment**—By Berger slow motion with side wheel, first introduced by Zeiss in 1898.

**Stages**—The fixed round stage furnished as regular equipment with Stand IIIC is 11 cm. in diameter. The simplified mechanical stage furnished as regular equipment with Stand IIICA is a non-revolving stage fitted with a movable plate giving a backward and forward movement by operating two screws jointly and a transverse motion by operating the same screws in opposite directions, with a range of displacement of 10 mm. This has been found a great convenience and for many purposes as satisfactory as the large mechanical stage. This simplified mechanical stage is also arranged as a revolving stage furnished as regular equipment for Stand IIICB. The plain revolving and centering vulcanite stage furnished as regular equipment with Stand IIID is the same as supplied with Stand IA and the large revolving mechanical stage supplied as regular equipment to Stand IIIE is the same as supplied with Stand IB. All of these stages are interchangeable and can be supplied as accessory equipment after the purchase of the regular microscope.

**Illuminating Apparatus**—These Stands are all furnished with the complete Abbe Illuminating Apparatus with Abbe condenser system of 1.40 N.A. as regular equipment. For very refined work we particularly recommend the addition of aplanatic condensing system of 1.40 N.A. or the achromatic centering condenser of 1.00 N.A.

The Stands are all furnished in fine polished mahogany cases and prices do not include oculars, nosepieces or objectives. For price on Complete outfits see page 323.

32152.	Stand IIIC with fixed round stage and Abbe Condenser of 1.40 N. A.	
	Duty Free.....	63.75
	Stock.....	79.05
32156.	Stand IIICA with simplified non-revolving mechanical stage and Abbe Condenser of 1.40 N. A.	
	Duty Free.....	66.25
	Stock.....	82.15
32160.	Stand IIID with plain revolving and centering vulcanite stage and Abbe Condenser of 1.40 N. A.	
	Duty Free.....	72.50
	Stock.....	89.90
32164.	Stand IIIE with large revolving mechanical stage and Abbe Condenser of 1.40 N. A.	
	Duty Free.....	91.25
	Stock.....	113.15



No. 32170

32170. Swingout Condenser Mounting, for Abbe Condenser of 1.40 N. A. If ordered with Stands IA, IB, IIC, IIIC, IIID, or IIID, extra  
 Duty Free..... 6.25      Duty Paid..... 7.75

Note.—The Aplanatic Condenser of 1.40 N. A. as furnished on Stand IC is not adaptable to the swingout mounting.

**REVOLVING STAGES, ZEISS.** The Plain Revolving Vulcanite Stage as well as the Large Revolving Mechanical Stage may be ordered separately at any time for use with both Stands I and III or may be ordered as additional accessories at the prices given below.

32172. Plain Revolving Vulcanite Centering Stage, only  
 Duty Free..... 6.25      Stock..... 7.75
32176. Large Mechanical Revolving Stage, with center housing.  
 Duty Free..... 25.00      Stock..... 31.00
32180. Center Housing, for use with plain revolving vulcanite stage or large mechanical stage.  
 Duty Free..... 4.25      Duty Paid..... 5.27

**SUBSTAGE CONDENSERS, ZEISS.** The following Condensers all fit interchangeably into the upper sleeve of the complete Abbe Illuminating Apparatus. In the series of Stands I and III previously listed we have included Condensers in the price but here list them separately with additional systems for special work for ready reference in making up the prices of special outfits.

32184. Abbe Condenser, three lens system, 1.40 N. A., equivalent focus 8 mm.  
 Duty Free..... 6.25      Stock..... 7.75
32188. Aplanatic Condenser, 1.40 N. A., equivalent focus 10 mm, particularly recommended for photomicrography with high power objectives of wide aperture.  
 Duty Free..... 15.00      Stock..... 18.60

Note.—The front lens of both the preceding Condensers may be removed and the remaining lenses used as a long focus Condenser of small aperture work. When the complete set is used with objectives of large aperture the Condenser should be used in immersion contact with the slide.

32192. Centering Achromatic Condenser of 1.0 N. A., equivalent focus 14 mm. This condensing system has an iris diaphragm mounted between the lenses and the iris diaphragm of the Abbe Illuminating Apparatus should, therefore, remain opened when this condenser is used. This Condenser is recommended for the most refined investigations in both ocular and microphotographic observations with objectives up to 1.0 N. A. and for best results should be used in immersion contact with the slide.  
 Duty Free..... 18.75      Stock..... 23.25
32196. Condenser, Quartz, of 1.30 N. A. with interchangeable upper part reducing the aperture to 0.8. For use in work with the Ultra-Violet as in the Luminescence Microscope.  
 Duty Free..... 17.50      Stock..... 21.70
32200. Condenser, Paraboloid, for dark field illumination.  
 Duty Free..... 10.00      Stock..... 12.40
32204. Paraboloid Stops, for Zeiss Achromatic Objectives DD, E, F, J and  $\frac{1}{16}$  inch and Apochromatic Objectives of 4 mm focus and less.  
 Duty Free..... .25      Stock..... .31

Note.—For best results in dark field illumination with the Zeiss Paraboloid Condenser, Arc Lamp No. 3248 page 331 or Nernst Lamp are recommended. The Condenser should be used in immersion contact with the slide, care being taken to avoid air bubbles. With all dry objectives of moderate power dark field illumination is obtained by total reflection at the cover glass. With dry objectives of high power and all oil immersion objectives a stop must be introduced into the objective mount in order to reduce the aperture of the objective to about 0.8. This stop is indispensable with immersion objectives of over 1.0 N. A. since dark ground illumination is produced in them not by total reflection at the surface of the cover glass but exclusively from the illumination of apertures above 1.0 N. A. The very considerable reduction of aperture of immersion objectives which is thus necessary to secure proper dark field illumination reduces their resolving power to such an extent as to make it advisable to use the higher power dry objectives wherever possible. The Paraboloid stops for the objectives are furnished without charge when both condenser and objective are ordered at the same time.

**OCULARS, ZEISS.** Huyghenian or Orthoscopic Ocals should never be used with Apochromatic Objectives as they are computed only for use in connection with the achromatic systems. The Compensating Ocals, on the other hand, may be satisfactorily used with Achromatic Objectives of considerable aperture, i.e., 0.5 N. A. and upwards or, in other words, with Achromatic Objectives DD, E, F and  $\frac{1}{16}$  inch Oil Immersion. The two new Orthoscopic Ocals are recommended for use with Achromatic Objectives where high magnification with large field of view is required. As in the case of Compensating Ocals they permit the use of the eye at a very comfortable distance above the eye lens with the entire field in view.

32208. Zeiss Huyghenian and Orthoscopic Ocals.

	Huyghenian				Orthoscopic		
Designation No.....	1	2	3	4	5	6	7
Equivalent focus, mm.....	50	40	30	25	20	15	9
Magnification.....	3	4	5.5	7	9	12	20
Duty Free.....	1.50	1.50	1.50	1.50	1.50	6.25	6.25
Stock.....	1.86	1.86	1.86	1.86	1.86	7.75	7.75

**ZEISS ACHROMATIC AND APOCHROMATIC OBJECTIVES, HUYGHENIAN, ORTHOSCOPIC AND COMPENSATING OCULARS.** The tables on bottom of preceding page and those on this page give the principal optical data and prices. Please always specify focal length in addition to catalogue number in ordering. The information on this page with the tables of magnification on the following page will be found of great assistance in selecting the optical equipment for Zeiss Microscopes.

### 32212. Compensating Oculars, Zeiss.

	Seeker		Compensating Oculars			
Designation.....	2	4	6	8	12	18
Equivalent focus, mm.....	70	39	33	21	15	10
Duty Free.....	5.00	5.00	5.00	7.50	7.50	6.25
Stock.....	6.20	6.20	6.20	9.30	9.30	7.75

### Achromatic Objectives, Zeiss.

Class	Designation	Equivalent focus, mm.	Numerical Aperture	In combination with Huyghenian Ocular 2 with 160 mm tube length		Duty Free	Stock	
				Free work- ing distance mm.	Diameter of field of view, mm.			
32216.	A <sub>0</sub>	4	—	32	14	3.00	3.72	
32220.	A <sub>1</sub>	45	—	61	10	3.00	3.72	
32224.	A <sub>2</sub>	37	—	43	7.5	3.00	3.72	
32228.	A <sub>3</sub>	28	—	27	5.2	3.00	3.72	
32232.	A*	43-29	—	10-42	9-20	10.00	12.40	
32236.	aa	26	0.17	14	4	6.75	8.37	
32240.	A	15	0.20	9	2	5.00	6.20	
32244.	AA	17	0.30	7.5	2.5	7.50	9.30	
32248.	B	12	0.35	3	1.5	7.50	9.30	
32252.	C	7	0.40	1.8	0.9	7.50	9.30	
32256.	D	4.2	0.65	0.6	0.5	8.75	10.85	
32260.	†DD	4.3	0.85	0.4	0.5	12.50	15.50	
32264.	†DD with correction collar					17.50	21.70	
32268.	†E	2.8	0.90	0.25	0.35	15.00	18.60	
32272.	†E with correction collar					20.00	24.80	
32276.	†F	1.8	0.90	0.17	0.23	18.75	23.25	
32280.	†F with correction collar					23.75	29.45	
32284.	PI	25	0.11	36	4	5.00	6.20	
32288.	D*	4.4	0.75	1.5	0.55	18.75	23.25	
32292.	J	1.8	1.18	0.2	0.23	27.50	34.10	
32296.	J with correction collar					32.50	40.30	
32300.	Homogeneous	1-12 Inch	1.8	1.25	0.15	0.25	25.00	31.00
32304.	Immersion	1-12 Inch FH	1.8	1.30	0.13	0.22	35.00	43.40

† Fluorite system.

### Apochromatic Objectives, Zeiss.

Class	Equivalent focus, mm.	Numerical Aperture	Initial Magnifica- tion	With Compensating Ocular 4 at 160 mm. tube length		Duty Free	Stock	
				Free work- ing distance mm.	Diameter of field of view, mm.			
32308.	Dry Series	16	0.30	15.5	5	2	20.00	24.80
32312.		8	0.65	31	1.0	1	25.00	31.00
32316.		4	0.95	63	0.2	0.45	35.00	3.40
32320.		3	0.95	83	0.15	0.35	40.00	49.60
32324.	Water Immersion	2.5	1.25	100	0.18	0.25	62.50	77.50
32328.	Homogeneous Immersion	3	1.30	83	0.20	0.35	75.00	93.00
32332.		3	1.40	83	0.16	0.35	100.00	124.00
32336.		2	1.30	125	0.16	0.25	75.00	93.00
32340.		2	1.40	125	0.12	0.25	100.00	124.00
32344.		1.5	1.30	167	0.09	0.20	87.50	108.50



## MAGNIFICATION TABLES FOR BAUSCH &amp; LOMB AND ZEISS OBJECTIVES AND OCULARS

Table of Magnifications with Bausch & Lomb Achromatic Objectives and Huyghenian Oculars computed upon the basis of tube length = 160 mm and projection distance = 250 mm.

Objectives		Eyepieces									
Equivalent focal length in mm.	Initial magnification of Objective	5x		6.4x		7.5x		10x		12.5x	
		Magnification	Size of field	Magnification	Size of field	Magnification	Size of field	Magnification	Size of field	Magnification	Size of field
48	2	10 ×	10.5 mm	13 ×	9.0 mm	15 ×	8.5 mm	20 ×	8.5 mm	25 ×	6.8 mm
32	4	20 ×	5.5 mm	25 ×	4.8 mm	30 ×	4.3 mm	40 ×	4.4 mm	50 ×	3.5 mm
16	10	50 ×	2.10 mm	64 ×	1.83 mm	75 ×	1.70 mm	100 ×	1.74 mm	125 ×	1.33 mm
8	20	100 ×	1.02 mm	130 ×	.90 mm	150 ×	.83 mm	200 ×	.85 mm	250 ×	.67 mm
4	43	215 ×	.48 mm	275 ×	.43 mm	320 ×	.39 mm	430 ×	.40 mm	560 ×	.32 mm
3	57	285 ×	.36 mm	368 ×	.32 mm	420 ×	.29 mm	570 ×	.30 mm	740 ×	.24 mm
1.9	95	475 ×	.22 mm	610 ×	.19 mm	720 ×	.17 mm	950 ×	.18 mm	1260 ×	.14 mm

Table of Magnifications with Zeiss Achromatic Objectives and Compensating Oculars at 160 mm tube length and calculated for an image distance of 250 mm.

Focus of the Objective, mm	Seeker	Compensating Oculars					
	2	4	6	8	12	18	
16	31	62	94	125	187	281	
8	62	125	187	250	375	562	
4	125	250	375	500	750	1125	
3	167	333	500	667	1000	1500	
2.5	200	400	600	800	1200	1800	
2	250	500	750	1000	1500	2250	
1.5	333	667	1000	1334	2000	3000	

Table of Magnifications with Zeiss Achromatic Objectives and Huyghenian and Orthoscopic Oculars at 160 mm tube length and calculated for an image distance of 250 mm.

Objectives	Huyghenian Oculars					Orthoscopic Oculars	
	1	2	3	4	5	6	7
A <sub>0</sub>	4.5	7	11	14	18	23	38
A <sub>1</sub>	7	10	16	20	25	35	57
A <sub>2</sub>	11	15	23	28	37	47	75
A <sub>3</sub>	20	26	38	47	55	68	110
A <sub>4</sub>	3-8	5-12	8-15	10-22	15-31	20-40	32-63
aa	21	31	46	57	75	95	150
A	42	54	79	97	120	165	260
AA	39	50	73	90	110	150	240
B	68	74	110	130	180	225	360
C	100	123	180	225	300	370	590
D	175	220	330	385	550	680	1100
DD	170	210	315	365	550	650	1050
E	275	345	505	620	830	1030	1650
F	410	510	735	900	1260	1540	2500
P1	25	33	48	60	80	100	160
D*	170	210	315	365	550	650	1050
J	410	515	750	920	1260	1570	2540
1-12	410	515	750	920	1260	1570	2540

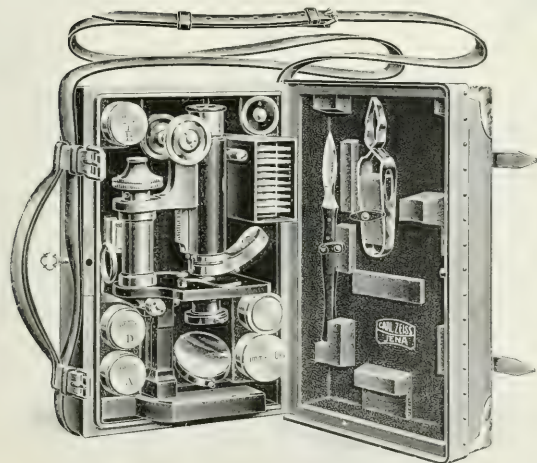
Table of Magnifications, working distance and diameter of field of view with Paired Oculars and Objectives when used on the Binocular Microscope

Zeiss Paired Objectives										
Paired Oculars	55		A <sub>2</sub>		A <sub>2</sub>		A <sub>2</sub>		P1	
	Magnification	Diameter of field mm	54	40	Magnification	Diameter of field mm	Magnification	Diameter of field mm	Magnification	Diameter of field mm
			Without diaphragm	With diaphragm						
Free Working distance mm	70				40		30		35	
No. 1	8	13	14	7.5	20	5	31	3.3	37	3
No. 2	9	13	15	7.5	23	5	35	3.3	42	3
No. 3	13	10.5	22	6.5	32	4.2	50	2.7	60	2.5
No. 4	16	8.5	27	4.8	40	3.3	61	2.2	73	2
No. 5	23	6.2	39	3.6	57	2.5	88	1.6	105	1.4
No. 6	26	7.1	46	4.1	67	2.7	103	1.8	121	1.6
No. 7	44	4.1	77	2.4	112	1.6	172	1.1	200	1

# COMPLETE ZEISS MICROSCOPE OUTFITS

With the preceding information as to Zeiss stands, stages and condensers and the optical data and prices of oculars and objectives, complete Zeiss outfits can be made up to meet all requirements. For the convenience of customers we list below commendable outfits on the basis of Stands I and III with both achromatic and apochromatic equipment.

<b>32348. Apochromatic Outfit on the basis of Stand IA,</b> i. e., with plain revolving vulcanite stage. Stand IA, with Abbe condenser of 1.40 N. A. and plain revolving vulcanite stage..... Triple Revolving Nosepiece..... Compensating Ocular 6..... " 12..... Apochromatic Objective, 16 mm..... " 4 mm..... " 2 mm..... 1.30 N. A.....	<b>Duty Free Stock</b> 81.25 100.75 5.00 6.20 5.00 6.20 7.50 9.30 20.00 24.80 35.00 43.40 75.00 93.00 228.75 283.65	<b>32360. Apochromatic Outfit on the basis of Stand IB,</b> i. e., with large revolving mechanical stage. Stand IB, with Abbe condenser of 1.40 N. A. and large revolving mechanical stage..... Triple Revolving Nosepiece..... Compensating Ocular 6..... " 12..... Apochromatic Objective, 16 mm..... " 4 mm..... " 2 mm..... 1.30 N. A.....	<b>Duty Free Stock</b> 100.00 124.00 5.00 6.20 5.00 6.20 7.50 9.30 20.00 24.80 35.00 43.40 75.00 93.00 247.50 306.90
<b>32352. Apochromatic Outfit on the basis of Stand IC</b> Stand IC with aplanatic condenser of 1.40 N. A. and special stage and accessories for micro-photography. Tube Slide for interchanging objectives..... 3 Objective slides..... Compensating Ocular 6..... " 12..... Apochromatic Objective, 16 mm..... " 4 mm..... " 2 mm..... 1.30 N. A.....	<b>Duty Free Stock</b> 112.50 139.50 2.00 2.48 6.00 7.44 5.00 6.20 7.50 9.30 20.00 24.80 35.00 43.40 75.00 93.00 263.00 326.12	<b>32364. Apochromatic Outfit on the basis of Stand IIIC</b> Stand IIIC with simplified mechanical stage and Abbe condenser of 1.40 N. A..... Triple Revolving Nosepiece..... Compensating Ocular 6..... " 12..... Apochromatic Objective, 16 mm..... " 4 mm..... " 2 mm..... 1.30 N. A.....	<b>Duty Free Stock</b> 66.25 82.15 5.00 6.20 5.00 6.20 7.50 9.30 20.00 24.80 35.00 43.40 75.00 93.00 213.75 265.05
<b>32356. Achromatic Outfit on the basis of Stand IIIC-A.</b> Stand IIIC-A, with simplified mechanical stage and Abbe condenser of 1.40 N. A..... Triple Revolving Nosepiece..... Huyghenian Ocular 2..... " 4..... Achromatic Objective A..... " D..... " 1-12" Oil..... Immersion 1.25 N. A.....	<b>Duty Free Stock</b> 66.25 82.15 5.00 6.20 1.50 1.86 1.50 1.86 5.00 6.20 8.75 10.85 25.00 31.00 113.00 140.12	<b>32368. Achromatic Outfit on the basis of Stand IIIE</b> with large revolving mechanical stage. Stand IIIE with large revolving mechanical stage and Abbe condenser of 1.40 N. A..... Triple Revolving Nosepiece..... Compensating Ocular 6..... " 12..... Apochromatic Objective, 16 mm..... " 4 mm..... " 2 mm..... 1.30 N. A.....	<b>Duty Free Stock</b> 91.25 113.15 5.00 6.20 5.00 6.20 7.50 9.30 20.00 24.80 35.00 43.40 75.00 93.00 238.75 296.05

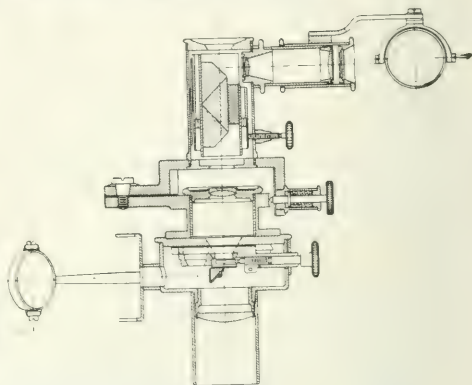
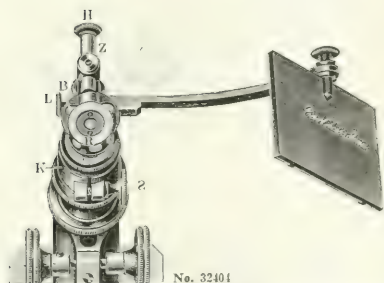
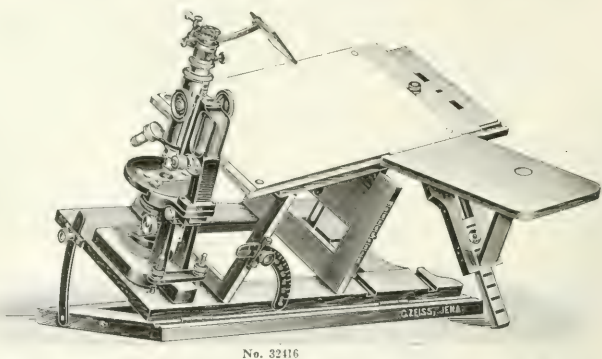
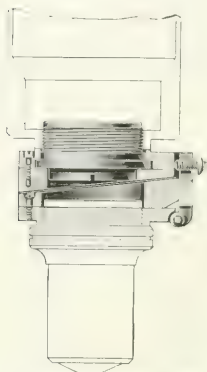


No. 32120

<b>32380. Microscope, Zeiss Traveling Stand IV,</b> a new and compact Microscope with 80 mm rectangular stage, substage condenser of 1.0 N. A. in a strong, well protected canvas carrying case designed especially for use in the tropics, but without oculars, nosepiece, objectives or accessories shown in illustration. Duty Free.....	42.50 Duty Paid..... 52.70
<b>32384. Accessories,</b> as shown in illustration, consisting of forceps, scalpel, scissors, dissecting needles, etc. Duty Free.....	2.25 Duty Paid..... 2.79

<b>32372. Portable Outfit, on the basis of Stand IV.</b> Zeiss Traveling Stand IV, as above..... Double Nosepiece..... Huyghenian Ocular 4..... Achromatic Objective A..... " D.....	<b>Duty Paid</b> 42.50 52.70 3.75 4.65 1.50 1.86 5.00 6.20 8.75 10.85 61.50 76.26
--	---

<b>32376. Portable Outfit, on the basis of Stand IV,</b> complete for bacteriological work. Zeiss Traveling Stand IV, as above..... Triple Revolving Nosepiece..... Huyghenian Ocular 4..... Achromatic Objective A..... " D..... " 1-12 inch..... 1.25 N. A.....	<b>Duty Paid</b> 42.50 52.70 5.00 6.20 1.50 1.86 5.00 6.20 8.75 10.85 25.00 31.00 89.25 110.67
---	---

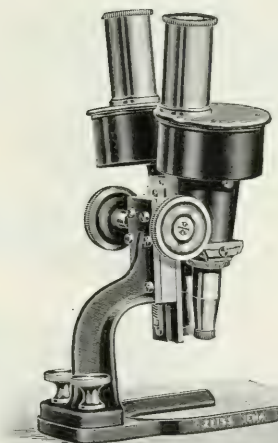


### Zeiss Microscope Accessories

	Zeiss Microscope Accessories	Duty Free	Stock
32388.	Triple Revolving Nosepiece.....	5.00	6.20
32392.	Double Revolving Nosepiece.....	3.75	4.65
32396.	Sliding Objective Changer, Tube Slide recommended for microphotographic work on account of accurate centering.....	2.00	2.48
32400.	Sliding Objective Changer, Objective Slide. One for each Objective.....	2.00	2.48
32404.	Large Abbe Drawing Camera, in case.....	15.00	18.60
32408.	Vertical Illuminator, prism form.....	4.50	5.58
32412.	" " , with iris diaphragm.....	9.50	11.78
32416.	Drawing Table, Bernhard.....	13.00	16.12
32420.	Ocular Micrometer, 10 to 100.....	1.88	2.33
32424.	" Contrast Micrometer, 5 mm, consisting of 50 squares in 0.1 and .05 mm.....	2.50	3.10
32428.	" " " " 10 mm " " 25 " in .4 and .2 mm.....	2.50	3.10
32432.	" Screw Micrometer with Ramsden ocular for use with achromatic objectives.....	22.50	27.90
32436.	Ocular Screw Micrometer with compensating ocular No. 6, for use with apochromatic objectives.....	26.25	32.55
32440.	Stage Micrometer, consisting of 3 mm divided into $\frac{1}{10}$ mm and $\frac{1}{10}$ mm divided into $\frac{1}{100}$ mm.....	2.13	2.64
32444.	Abbe Apertometer for measuring the numerical aperture of micro objectives.....	17.50	21.70
32448.	Microspectral Objective, Engelmann. See Bol. Zeit. 40, 419-426, 1882 and Pfleger's Arch. f. d. ges. Physiol. 27, 485-490, 1882.....	42.50	52.70
32452.	Spectral Ocular, Abbe (Microspectroscope).....	50.00	62.00
32456.	Maltwood Finder.....	5.00	6.20
32460.	Ocular, Abbe Stereoscopic, by the use of which any of the Zeiss Stands may be converted into a binocular microscope for use with any powers. The attachment is adjustable for the inter-pupillary distance of the observer and should be used with achromatic objectives only. Its use with a revolving nosepiece or with apochromatic objectives is not recommended. Duty Free.....45.00      Duty Paid.....55.50		



No. 32464



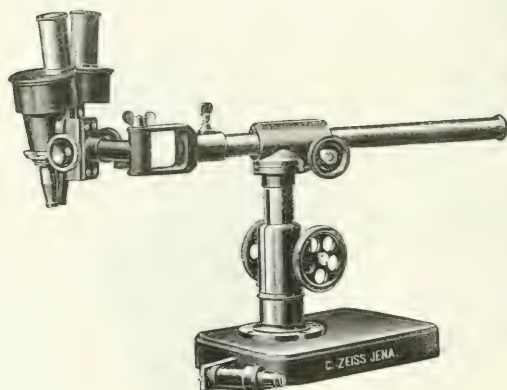
No. 32468

# **MICROSCOPE, ZEISS BINOCULAR STAND X, with image erecting prisms, paired oculars and objectives.**

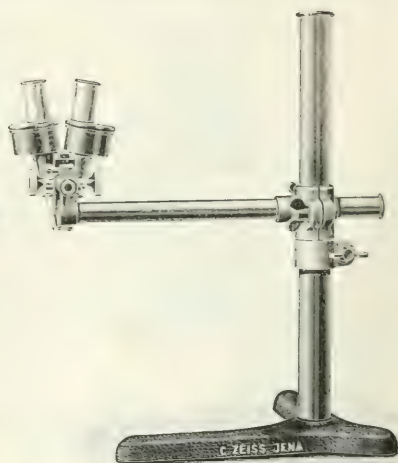
This is the original Binocular Microscope giving true stereoscopic vision and which has not only come into wide use of recent years but has been widely copied by other makers. The regular outfit includes the stage and base and the vulcanite fork for attaching when the Microscope is used with the stage and base as a Dermatoscope, as shown in upper right hand corner of illustration. It is also furnished as Stand XB, with rack and pinion elevating motion with extension arm with joint, which arrangement has found much favor with geologists, mineralogists, botanists and zoologists. A lower priced form of this stand is now offered for the first time as Stand XB, Simplified Model. Where one pair of binocular tubes is to be used on both Stand XA and XB, the tubes should be ordered as a part of the Stand XB outfit after which they can be used on the stage and base of Stand XA by means of the Straight Support No. 32476. This Support is also necessary when the Drüner Stereoscopic Camera is used in connection with Stand XA.

32464.	<b>Zeiss Binocular Stand XA</b> , with base, stage, hand rests for dissecting and vulcanite fork for use with the body tube as Dermatoscope, without objectives or oculars, in mahogany case.....	<b>Duty Free</b> 48.75	<b>Stock</b> 60.45
32468.	<b>Dermatoscope</b> , consisting of the upper part of Stand XA with the vulcanite fork but without stage and base and also without objectives and oculars, in case.....	33.25	41.23
32472.	<b>Vulcanite Fork</b> , only, for Dermatoscope.....	1.50	1.86
32476.	<b>Straight Support</b> , for use when the Drüner Stereoscopic Camera is to be used with Stand XA and also when the binocular body of Stand XB is to be used interchangeably on stage and base of Stand XA.....	2.50	3.10
32480.	<b>Zeiss Binocular Stand XB</b> , on heavy base, with rack and pinion vertical motion and extension jointed arm, without objectives or oculars, in mahogany case.....	65.00	80.60
32484.	<b>Zeiss Binocular Stand XB</b> , simplified model, as shown in illustration, without objectives or oculars, in mahogany case.....	40.00	49.60
32486.	<b>Adapter</b> , necessary for occasional use because it is impossible in either form of Stand XB to lower the tube sufficiently to focus on the plane of the table top or desk on which the base of the stand rests. If this feature is unnecessary this adapter need not be ordered.....	3.75	4.65

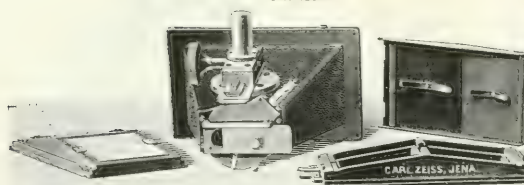




No. 32480



No. 32184



No. 32496



No. 32500

**Note**—Outfits involving the use of Stands XA and XB may be made up by ordering the paired oculars and objectives listed below. For the convenience of those wishing either a simple or a complete outfit we list two outfits on the basis of Stand XA as follows:—

32488. **Binocular Outfit**, on the basis of **Stand XA** giving a range of magnification from 9 to 40 diameters, with fields from 13 to 3.3 mm in diameter.

	Duty Free	Stock
Zeiss Binocular Stand XA.....	48.75	60.45
Paired Oculars 2.....	3.00	3.72
" " 4.....	3.00	3.72
Paired Objectives 55.....	11.25	13.95
" " A2.....	11.25	13.95
	<hr/>	<hr/>
	112.25	95.79

Zeiss Binocular Stand XA.....	Duty Free	Stock
" " " 2.....	48.75	60.45
" " " 4.....	3.00	3.72
" " " 6.....	3.00	3.72
" " " 12.....	12.50	15.50
Paired Objectives 55.....	11.25	13.95
" " " A <sub>0</sub> .....	11.25	13.95
" " " A <sub>1</sub> .....	11.25	13.95
" " " A <sub>2</sub> .....	11.25	13.95
	112.25	139.19

32496. **Stereoscopic Camera, Drüner**, for use with Binocular Microscope, with instantaneous shutter, focusing frame with ground glass and clear glass screens and plate holder for a pair of plates 6 x 6 cm. For use on Stand XB without additional accessory or on Stand XA by the use of Straight Support No. 32476.

Duty Free	Duty Paid
35.00	43.40
4.50	5.58

32500. Reflecting Stereoscope for obtaining orthomorphic views of the negatives made with above camera, with a magnification of two diameters. See *r. Rohr*, "Die binokularen Instrumente," Berlin, 1907, published by Julius Springer and H. Braus, *Zeitschr. f. wiss. Mikr.*, **XXV**, 1908, pp. 282-287.

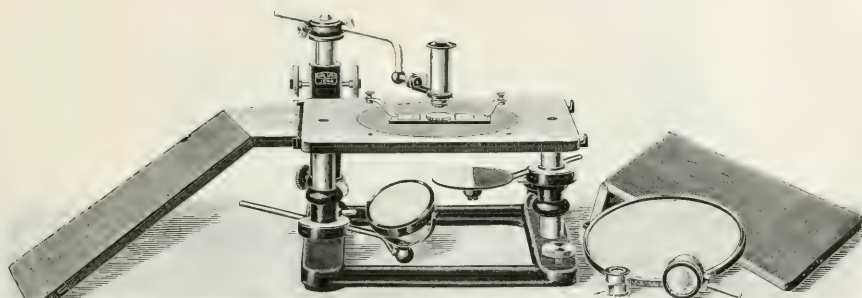
12.00	14.88
-------	-------

32594. **Paired Objectives**, for Zeiss Binocular Microscope. For magnification, etc., see page

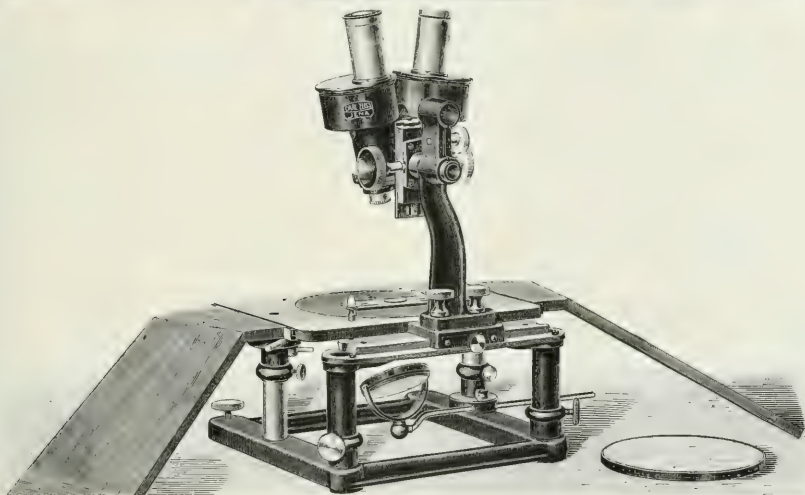
Designation.....	A <sub>0</sub>	A <sub>2</sub>	A <sub>3</sub>	Pl
Duty Free.....	11.25	11.25	11.25	13.75
Stock.....	13.5	13.95	13.95	17.00

- |        |  |      |       |       |
|--------|--|------|-------|-------|
|        | Stock.....   | 13.5 | 13.95 | 13.95 |
| 32508. | Paired Oculars for Zeiss Binocular Microscope. For magnification, etc., see page 322 |      |       |       |

Designation.....	1	2	3	4	5	6	7
Duty Free.....	3.00	3.00	3.00	3.00	3.00	12.50	12.50
Stock.....	3.72	3.72	3.72	3.72	3.72	15.50	15.50



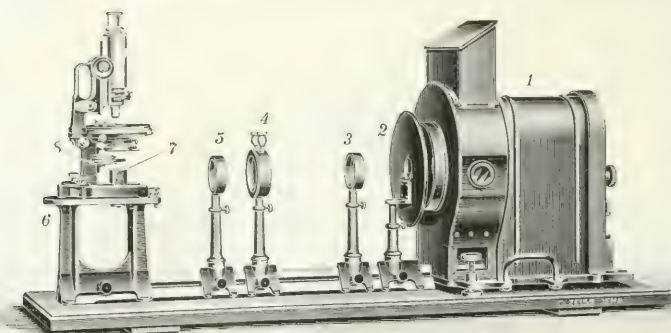
No. 32512—with 32516 and Brucke Combination 31016



No. 32512 with 32536

**MICROSCOPE, DISSECTING, MEYER-ZEISS**, a large dissecting microscope of almost universal application with the great variety of accessories offered; particularly recommended for use with the Binocular body, but may be fitted with simpler magnifiers such as the Anastigmatic No. 31024, the Brucke dissecting combination or with either the monocular or binocular compound microscopes, as on Zeiss stands XA, XB, XC or XI.

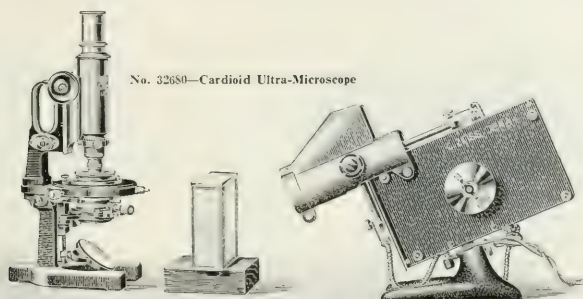
		Duty Free	Duty Paid
32512.	<b>Dissecting Stand</b> with adjustable mirror and light modifying device, stage measuring 3 x 6 inches, round stage opening $4\frac{1}{2}$ inches in diameter, brass disc and plate glass disc to fit the stage opening, two arm rests, and holder fitted with rack and pinion for magnifiers and composite dissecting lenses.....	24.50	30.38
32516.	<b>Idlto</b> , with simple sliding lens holder.....	17.50	21.70
32620.	<b>Cabinet</b> for the stand, of alderwood.....	3.00	3.72
32524.	<b>Round Foot</b> rendering the lens holders available for use as lens stands independently of the dissecting microscope.....	1.75	2.17
<b>Note</b> —The stand of the new dissecting microscope may be use in conjunction with the body of the binocular microscope X b, the Drüner camera, the body of the erecting microscope X 1, as well as a single tube similar to that of Stand IX. For this purpose we supply a yoke attachment of two patterns:			
32528.	<b>Yoke with Slide Carriage</b> for giving a traversing motion of the microscope body, with two fixing screws.....	6.75	8.37
32532.	<b>Yoke without Traversing Slide Carriage</b> , with two fixing screws.....	2.75	3.41
<b>Note</b> —The various Bodies which may be attached to the yoke are subject to the following prices:—			
32536.	<b>Body of the Binocular Microscope Xb</b> .....	27.50	34.10
32540.	<b>Drüner Stereoscope Camera</b> .....	35.00	43.40
32544.	<b>Pillar Bracket</b> for the attachment to the yoke of the camera or the body of Stand Xb.....	2.50	3.10
32548.	<b>Pillar Bracket</b> for the attachment of the body of Stand Xb in an inclined position.....	2.00	2.48
32552.	<b>Body of the Single-tube Erecting Microscope X1</b> with exceptionally large radial extension.....	18.75	23.25
32556.	<b>Body similar to that of the Single-tube Stand X1</b> .....	7.50	9.30
<b>Note</b> —The following parts are required to render the stand available for use as a ball stage microscope:			
32560.	<b>Ball Stage</b> to drop into the stage opening.....	3.75	4.66
32564.	<b>Raising Block</b> for attachment between the yoke and the pillar bracket, with two long fixing screws.....	1.88	2.33
32568.	<b>Drawing Apparatus</b> for use with the Mayer Dissecting Microscope.....	31.25	38.75



No. 32674—Luminescence Microscope

**MICROSCOPE, LUMINESCENCE, ZEISS.** This apparatus consists of an ordinary Microscope Stand as used for other work, with Achromatic or Apochromatic Objectives and either Huyghenian or Compensating Oculars, and differs only in the illuminating apparatus and source of light. In order that the illuminating apparatus permit the radiation of the object with ultra-violet light, which causes the luminescence, it is essential that the object slide as well as the condenser system be of quartz, which is permeable for the ultra-violet ray, exactly as is required in the micro-photographic outfit for ultra-violet light. The source of light may be either an arc lamp with specially prepared carbons or a Quartz Mercury Vapor Lamp, both of which are rich in ultra-violet rays. A collector condensing system of quartz lenses is also necessary. Light, particularly of wavelength visible to the eye, must be cut out by means of ultra-violet filters in order that the object may be examined solely in the fluorescent light originating from it under the action of the ultra-violet ray. The Lehmann filter with the additional filters of blue Uviol glass provides this feature. The illustration shows the outfit complete with Zeiss Microscope Stand III in position and the hand regulating arc lamp, but with the diaphragm removed to better display the remaining parts. For more detailed description send for a copy of Zeiss *Micro 325*. The component parts of the equipment with individual prices are as follows:

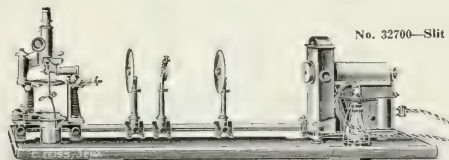
	Duty Free	Duty Paid
32572. Base Board, with optical bench 70 cm long.....	8.75	10.85
32576. Diaphragm Arrangement.....	5.00	6.20
32580. Blue Uviol Glass Disc, 6 cm diameter, on support.....	7.00	8.68
32584. UV Filter, 6 cm diameter, on support.....	17.00	21.08
32588. Wash Bottle, for filling and emptying the UV Filter.....	.69	.85
32592. Quartz Condensing Lens, plano-convex, 6 cm in diameter, on support.....	13.25	16.43
32596. Support for microscope with quartz prism.....	12.50	15.50
32600. Quartz Substage Condenser with iris diaphragm.....	17.50	21.70
32604. Centering Device for above.....	3.00	3.72
32608. Uranium Glass Plate, with circular ring for centering.....	2.00	2.48
32612. Plane mirror in mounting, for the convenient observation of the uranium glass centering plate.....	.38	.47
32616. Micro Slide of Quartz, 0.5 mm thick, 25 x 30 mm.....	1.13	1.40
32620. Cover Glass, of Euphos glass, 0.17 to 0.20 mm thick, 12 mm in diameter.....	.25	.31
32624. Object Carrier, Heidenhain, for the convenient manipulation of the quartz slides.....	.50	.62
32628. Hand Regulating Arc Lamp, for 10 amperes.....	13.50	16.74
32632. Carbons, special, impregnated with nickel, per 50 pairs.....	1.75	2.17
32636. Quartz Condensing Lens, consisting of two plano-convex lenses of quartz, 4 cm in diameter, on support.....	10.75	13.33
32640. Rheostat, for 110 volts, alternating or direct current, for either 5 or 10 amperes.....	8.00	9.92
32644. Rheostat, for 220 volts, alternating or direct current, for either 5 or 10 amperes.....	10.63	13.18
Note—As an alternative to the Arc Lamp above listed the Quartz Mercury Vapor Lamp may be used as a source of light as follows:—		
32648. Quartz Mercury Vapor Lamp.....	32.50	40.30
32652. Light Box for above.....	27.50	34.10
32656. Quartz Condensing Lens, similar to above, but consisting of a meniscus and plano-convex lens of 4 cm diameter, on support.....	12.00	14.88
32660. Rheostat for 110 volts direct current.....	10.00	12.40
32664. Additional Rheostat making above available for 220 volts direct current.....	6.25	7.75
32668. Extra Quartz Lamp, only, for replacement.....	11.25	13.95
32672. Microscope, Zeiss Stand IIIDQ as shown in illustration and specially designed for this outfit.....	60.00	74.40
32674. Complete Luminescence Outfit with Arc Lamp as above with rheostat for 110 volts.....	282.45	350.23
32675. Complete Luminescence Outfit with Arc Lamp as above with rheostat for 220 volts.....	285.08	353.49



No. 32680—Cardioid Ultra-Microscope

**ULTRA-MICROSCOPE, ZEISS CARDIOID CONDENSER TYPE.** The Cardioid Microscope as devised by Siedentopf is designed for bringing into view ultra-microscopic particles by means of a simplified attachment (the cardioid condenser) providing a remarkable light concentrating power. By this arrangement the rays of high aperture are employed to illuminate the object, while those of low aperture reach the eye. The difficulty occasioned by the presence of surface impurities, the maintenance of a stratum of the correct thickness and the absorbing properties of the ultra-microscopic particles have been avoided by the use of a suitably designed chamber. The Cardioid Ultra-Microscope is primarily adapted for the examination of colloid solutions, diluted precipitates and for the observation of micro-chemical and photo-chemical reactions. Where a suitable microscope and source of light are already available it is only necessary to provide the Special Equipment. In the illustration the Cardioid Condenser is shown in position on Zeiss Stand III equipped with the special apochromatic 3 mm objective with centering appliance, Cardioid Condenser in position on substage and quartz chamber in position in its holder on the stage, with the water cooling cell and arc lamp in position. *For more detailed description send for Zeiss Mikro 306.*

32676.	Special Cardioid Condenser Equipment, consisting of trough for water cooling without wooden support; Cardioid Condenser; quartz chamber; chamber holder; special apochromatic objectives 3 mm, N.A. 0.9; centering appliance for special apochromatic objective; compensating ocular 18 with sliding lens system; Huyghenian ocular 1 as searcher ocular, and platina collar with two accessory supports, in case, but without Microscope stand or arc lamp as shown in illustration. <b>Duty Free</b> .....	66.50	<b>Duty Paid</b> .....	82.46
32680.	Complete Cardioid Ultra-Microscope Outfit, consisting of above Special Equipment and Zeiss Stand IIIA, Arc Lamp No. 32848 as shown in illustration, with rheostat for 110 volts and 50 carbons. <b>Duty Free</b> .....	134.76	<b>Duty Paid</b> .....	168.51
32684.	Complete Cardioid Ultra-Microscope Outfit, as above, with rheostat for 220 volts. <b>Duty Free</b> .....	136.26	<b>Duty Paid</b> .....	170.37
32688.	Cardioid Condenser, only. <b>Duty Free</b> .....	10.00	<b>Duty Paid</b> .....	12.40

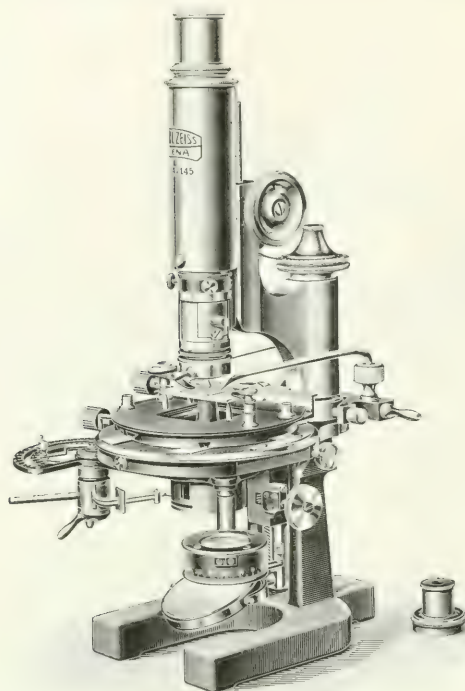


No. 32700—Slit Ultra-Microscope

**ULTRA-MICROSCOPE, ZEISS SLIT TYPE,** an improved arrangement of the Siedentopf and Zsigmondy apparatus originally announced in 1904 and which by the orthogonal arrangement of the direction of illumination and observation and the micrometrically alterable thickness of the illuminating beam in relation to the depth of definition of the objective, entirely removes the powerful absorptive effect of the upper surface of the slide and the lower surface of the cover glass. This arrangement is specially recommended for the investigation of all colloidal substances, serum solutions, drinking water, etc. With some additions as listed in separate outfit this arrangement is the only practical one for the investigation of ultra-micros inside solid bodies, glasses and crystals. *For more detailed description send for Zeiss Mikro 239.* Suitable outfits for both liquid colloids and solid colloids are offered as follows:—

32700.	Complete Slit Type Ultra-Microscope Outfit for Liquid Colloids, consisting of table top with optical bench; objective $f = 120$ mm in disc-stop on saddle stand; precision slit on saddle stand capable of being rotated by $90^\circ$ ; objective $f = 55$ mm in disc-stop on saddle stand; sole-plate with cross slide for the optical bench with intermediate-plate; achromatic objective AA for the cross slide; immersion objective D <sup>+</sup> with trough holder and screw-ring in case, trough with fixed sleeve with conical adapter and hose-clamp; Stand V without mirror, stage or case; Huyghenian ocular 4, cross ruled, with sliding eyelens; Weule's automatically regulating arc lamp for direct current, 5 amperes, with diaphragm for the casing and rheostat for 110 volts. <b>Duty Free</b> .....	172.65	<b>Duty Paid</b> .....	214.09
32704.	Complete Slit Type Ultra-Microscope Outfit, as above, with rheostat for 220 volts. <b>Duty Free</b> .....	177.38	<b>Duty Paid</b> .....	219.95
32708.	Additional Equipment to above for Solid Colloids, consisting of achromatic objective C, polarizer on saddle stand, Analyzer I and Zeiss Microscope Stand IV with stage to raise and lower, without Abbe illuminating apparatus, and with case. <b>Duty Free</b> .....	120.75	<b>Duty Paid</b> .....	149.73





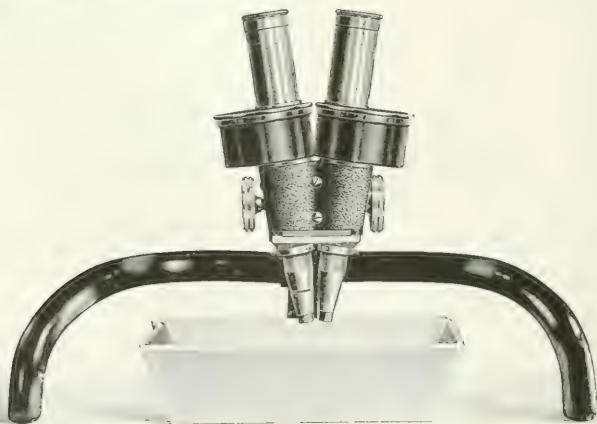
No. 32732

32732. Microscope, Zeiss, for the Observation of Liquid Crystals, consisting of Stand IV, with large mechanical stage divided in degrees with index, but without condenser system, diaphragm holder and iris diaphragm; with gas heating condenser with air cooling apparatus; preparation stage for the large mechanical stage; rotatory and adjustable analyser with selenite film for red of the first order; objectives A and D, each with water cooling arrangement; cross line oculars 2 and 4; micrometer ocular H3 and compressed air cylinder.

Duty Free.....221.25  
Duty Paid.....274.35

32736. Microscope, Zeiss, same as above, but with analyzer, to be put on the ocular instead of the rotatory and adjustable analyser.

Duty Free.....207.50  
Duty Paid.....257.30



No. 32740

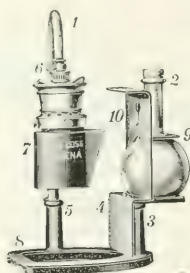
32740. Microscope, Binocular, Chun, with image erecting prisms, as used for dissecting and observing small animals in trays or on plates of large dimensions. The legs of the stand are jointed and may be extended or brought together to suit the size of the vessel. With paired oculars Nos. 2 and 4 and paired objectives of 77 mm and 40 mm focus, giving a range of magnifications from about 10 diameters to 50 diameters.

Duty Free.....80.50  
Duty Paid.....115.95

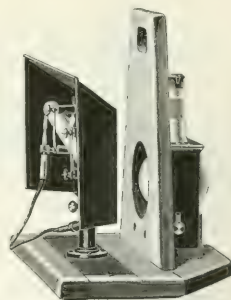




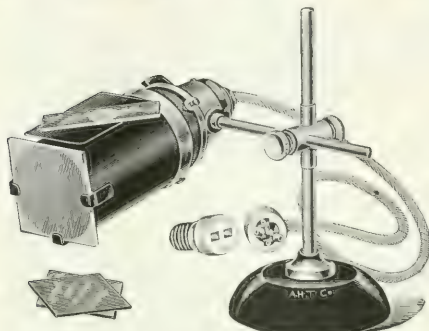
No. 32900



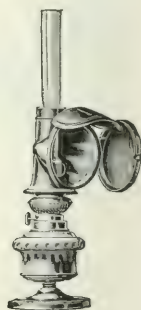
No. 32908



No. 32912



No. 32928



No. 32932

- |        |   |      |
|--------|---|------|
| 32900. | <b>Flask Condenser</b> , in wooden stand for filling with distilled water; for use with either the Bausch & Lomb Nernst Lamp or Welsbach Lamp No. 32896, particularly in dark-field illumination . . . . .  | 2.25 |
| 32904. | <b>Flask</b> , only . . . . .   | .75  |
| 32908. | <b>Micro Lamp, Incandescent Gas, Zeiss</b> , with inverted mantle and flask condenser. . . . .  | 6.80 |
|        | <b>Duty Free</b> . . . . .  | 5.00 |
| 32912. | <b>Micro Lamp, Zeiss, for Monochromatic Light</b> , consisting of a mercury vapor arc lamp 20 cm long, specially made for this work, support, screen, and Jena glass flask to act as both condenser and ray filter; particularly valuable in refined microscopic work where it is of advantage to use a beam of light of a given wavelength. By using different solutions in the composition of the ray filter monochromatic light of wavelengths as indicated below are available. |      |

Filter for yellow light,  $\lambda = 579$  and  $576 \mu\mu$ .Filter for green light,  $\lambda = 546 \mu \mu$ .

Potassium bichromate.....	15 grams
Copper sulphate .....	3.5 grams
Sulphuric acid.....	15 cc

Picric acid.....	0.4 grams
Copper sulphate.....	3.5 grams
Didymium nitrate.....	1.5 grams

**Note**—The above formula without the Didymium nitrate gives a yellowish green light of wavelength  $\lambda = 579$ ,  $\lambda = 576$  and  $\lambda = 546 \mu\mu$ .

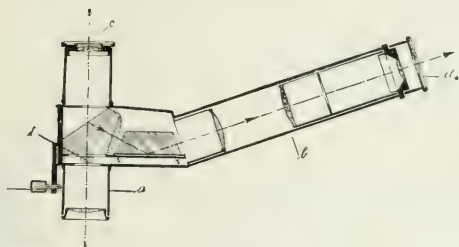
Filter for blue light  $\lambda = 436 \mu \mu$ .

Copper sulphate.....	1 gram
Distilled water.....	225 cc
Ammonia.....	75 cc

Note—This filter is transparent also to the violet rays of wavelength 407 and 405  $\mu\mu$ .

Reference—A Köhler Über die Verwendung des Quicksilberlichts für mikroskopische Arbeiten; Zeitschr. für wiss. Mikroskopie, XXVII, 1910.

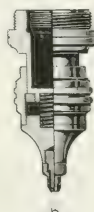
- [illegible]



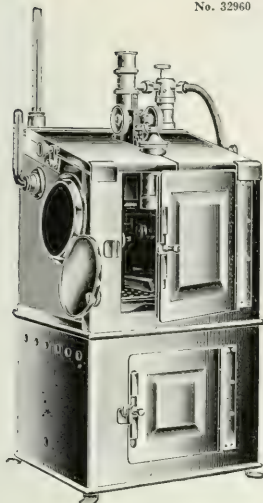
No. 32960



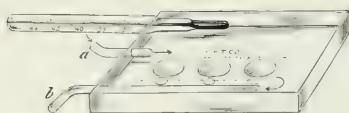
No. 32936



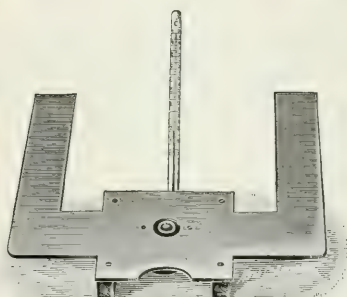
No. 32940



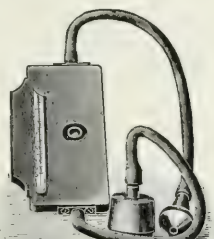
No. 32944



No. 32948



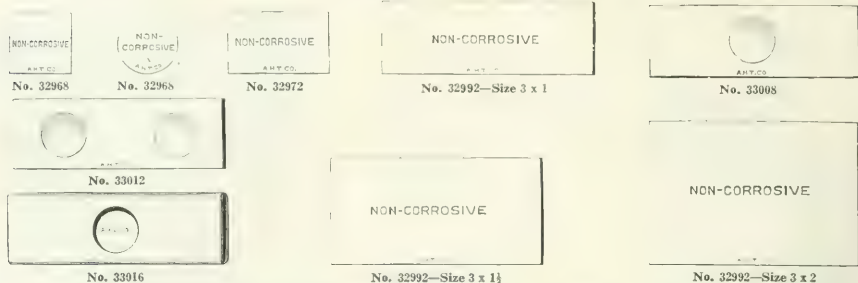
No. 32952



No. 32956

32936. **Micro Object Marking Apparatus.** This device is mounted in a society screw and can be inserted in place of the objective or carried on the nosepiece for use when occasion demands. After the field to be marked is found the diamond point is set to engrave a circle around same, the smallest circle possible being  $\frac{1}{2}$  mm. After the circle is made, the field can always be easily located by the use of a low power objective at first. This apparatus is intended for use only on preparations mounted under a cover glass.  
Duty Free ..... 10.50      Stock ..... 14.00
32940. **Micro Object Marking Apparatus,** in objective mounting for screwing into nosepiece. This arrangement marks by means of a colored ring on the cover glass. The apparatus is filled with coloring matter and when brought gently in contact with the slide leaves a small ring. .... 4.50
32944. **Microscope Oven, Plehn-Nuttal,** for constant temperatures, improved construction, with metal parts of Nickelin, a non-corrodible alloy. With micro burner and metallic thermoregulator, but without thermometer or microscope  
Duty Free ..... 61.05      Duty Paid ..... 81.40
32948. **Micro Warm Stage, Pfeiffer,** with three concavities for hanging drop, tubulations for inflow and outflow of water and thermometer graduated from  $33^{\circ}$  to  $44^{\circ}$  C. in  $\frac{1}{4}$ ths ..... 7.50
32952. **Micro Warm Stage, Schultze,** consisting of a "U" shaped metal stage to which heat is applied by means of an alcohol lamp or small burner. The stage is fitted with a condenser which renders it available for observations under a high power, and has a thermometer reading to  $100^{\circ}$  C. .... 12.00
32956. **Micro Warm Stage, Stricker,** consisting of a flat metal chamber through which a constant stream of warm water may be passed; with a lens at the center making it available for use with high powers. A thermometer is provided with bulb within the chamber and scale on the outside of stage. .... 14.00
32960. **Ocular, Double Demonstrating,** for use with two observers, with pointer in the common field of view, with power of 6 X.  
Duty Free ..... 17.60      Duty Paid ..... 22.00





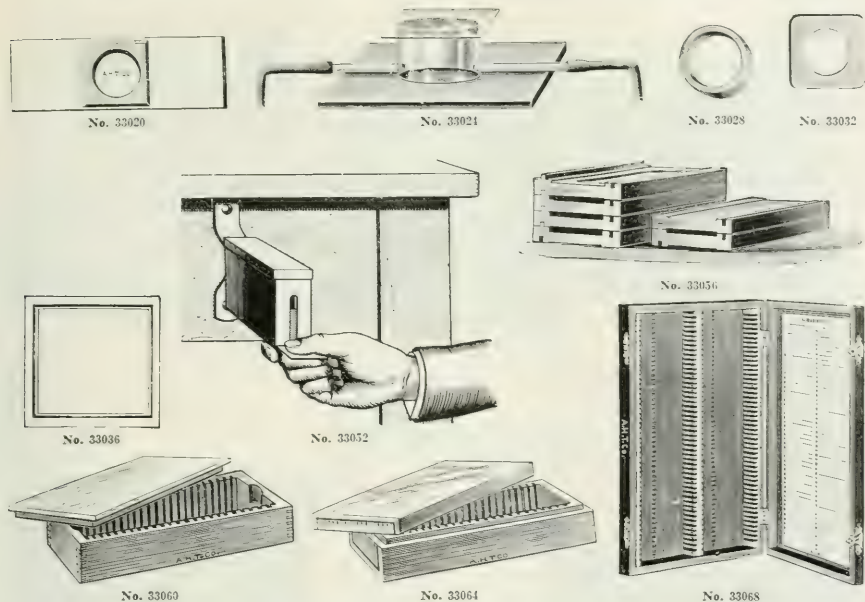
### Thickness of Cover Glasses.

No. 1—varying from 0.13 to 0.17 mm (1/200 to 1/150 inch)  
 No. 2— “ “ 0.17 to 0.25 mm (1/150 to 1/100 inch)  
 No. 3— “ “ 0.25 to 0.50 mm (1/100 to 1/50 inch)

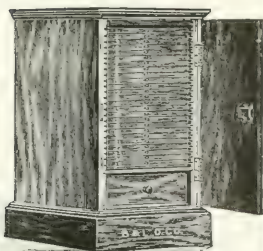
### Number of Cover Glass in 1/2 Oz. Boxes.

1/2 oz. box of No. 1, 18 mm square contains 136 covers.  
 1/2 oz. box of No. 2, 22 mm circles contains 90 covers.  
 1/2 oz. box of No. 1, 22 x 40 rectangles contains 156 covers.

32964.	Micro Cover Glasses, "Non-Corrosive," Blue Label, uniform in color and smoothly cut. Carefully packed in 1/2 oz. round cardboard boxes. Please specify size, shape and thickness in ordering.	Size, mm, squares or circles.....	12	15	18	22	25
	Per 1/2 oz. box No. 1.....		.38	.38	.38	.38	.38
	“ “ “ No. 2.....		.30	.30	.30	.30	.30
	“ “ “ No. 3.....		.25	.25	.25	.25	.25
32968.	Micro Cover Glasses, "Non-Corrosive," Red Label, guaranteed against corrosion in any climate. Glass is of slightly greenish tint. Neatly packed in 1/2 oz. round wooden boxes. A specialty of our own introduction in very wide use. Please specify size, shape and thickness in ordering.	Size, mm, squares or circles.....	12	15	18	22	25
	Per 1/2 oz. box No. 1.....		.45	.45	.45	.45	.45
	“ “ “ No. 2.....		.35	.35	.35	.35	.35
32972.	Micro Cover Glasses, "Non-Corrosive," Red Label, rectangular shape. Most used sizes.	Size, mm.....	22 x 30	22 x 32	22 x 36	22 x 40	22 x 50
	Approx. contents of 1/2 oz. box of No. 1.....		60	58	50	48	38
	“ “ “ “ “ No. 2.....		53	50	41	38	26
	Per 1/2 oz. box of No. 1.....		.75	.75	.75	.75	.75
	“ “ “ “ “ No. 2.....		.50	.50	.50	.50	.50
	Size, mm.....		24 x 40	24 x 50	35 x 50	35 x 62	43 x 50
	Approx. contents of 1/2 oz. box of No. 1.....		44	37	26	22	16
	“ “ “ “ “ No. 2.....		34	26	20	16	15
	Per 1/2 oz. box of No. 1.....		.75	.75	.75	.75	.75
	“ “ “ “ “ No. 2.....		.50	.50	.50	.50	.50
32976.	Micro Slides, Standard White, Blue Label, with carefully ground edges, average thickness 1 1/2 to 1 3/4 mm; carefully packed with paper between each slide, in 1/2 gross cardboard boxes.	Size, inches.....	2 x 1	3 x 1	3 x 1 1/2	3 x 2	3 x 2
	Per 1/2 gross box.....		.45	.45	.75	1.10	1.10
32980.	Micro Slides, same as above, 3 x 1 inches, but 1/2 to 1 1/2 mm thick. Per 1/2 gross box.....						
32984.	“ “ “ “ “ 3 x 1.....						
32988.	Micro Slides, same as above, i.e. 1/2 to 1 1/2 mm thick, 1 1/2 x 1 inch, for petrographers. Per 1/2 gross box.....						
32992.	Micro Slides, "Non-Corrosive," Red Label, with well ground edges. The limits of thickness are usually from 1/2 to 1 3/4 mm but the slides in any one box are usually of the same thickness. A specialty of our own in wide use. This slide is of a slightly greenish tint and is guaranteed not to corrode or become cloudy in any climate. Size, inches.....		3 x 1	3 x 1 1/2	3 x 2	3 x 2	3 x 2
	Per 1/2 gross box.....		.45	1.00	1.25		
32996.	Micro Slides, same as above but carefully selected to be between 1 1/2 and 2 mm thick, and as free from striae and scratches as possible as required in the U. S. Bureau of Plant Industry. In 3 x 1 inch size only. Per 1/2 gross box.....						
33000.	Micro Slides, for Brain Sections, with carefully ground edges and about 2 mm thick.	Size, mm.....	80 x 110	100 x 150	115 x 150	160 x 190	
	Per 100.....		6.00	8.00	9.00	15.00	
33002.	Micro Covers for Brain Sections, of glass varying from .5 to .7 mm thick.	Size, mm.....	40x55	40x90	45x70	65x100	65x110
	Per 100.....		1.10	1.80	1.60	3.25	3.60
33004.	Micro Covers of Mica, for Brain Sections, carefully selected to be as free as possible from striae, etc.	Size, mm.....	40 x 55	40 x 90	45 x 70	65 x 100	65 x 110
	Per 100.....		1.80	4.80	3.60	12.00	13.20
33008.	Culture Slide, 3 x 1 inches, with polished spherical concavity 12 mm in diameter; as used for hanging drop and similar reactions. Each.....						
33012.	Culture Slide, same as No. 33008 but with two concavities. Each.....						
33016.	“ “ “ 3 x 1 inches, of heavy polished plate glass with flat bottom, depression 3 mm deep and 16 mm in diameter. Inside of bottom is smooth, but not polished. For drop cultures, etc. Each.....						



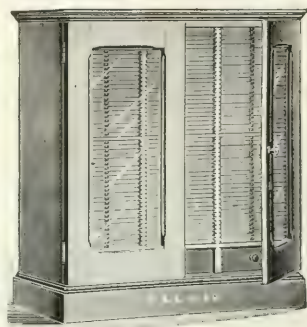
33020.	Culture Slide, consisting of heavy polished plate glass slide with cell, 15 mm in diameter, 3 mm deep, fused on in electric furnace. The advantage of this slide is that the bottom of the cell consists of the plate glass slide free from inequalities.....	.35
33024.	Culture Slides, for cultures, electrolysis, etc., with side tubes and cover glass.....	1.00
33028.	Glass Rings for Micro Slides, with edges finely ground, for cementing on ordinary slides to make cells	
	Diameter, mm.....	15 18 18 22
	Height, mm.....	3 5 10 9
	Each.....	.08 .10 .10 .15
33032.	Glass Cells for Micro Slides, consisting of a square plate of glass, with circular hole.	
	Diameter of hole, mm.....	10 10 15 15 18 18
	Thickness of glass, mm.....	1 2 1 2 1 2
	Each.....	.15 .15 .15 .15 .15 .15
33036.	Micro Labels, for slides, with border, 22 mm square Per box of 100.....	.10
	Per carton of 10 boxes.....	.75
33040.	" " " " " " rectangular, 22 x 15 mm. Per box of 100.....	.10
	Per carton of 10 boxes.....	.75
33044.	" " " " in books of 500 labels each. These labels are printed on best white gummed paper and are scored as to be readily torn from the book, leaving clean edges, interleaved with paraffine paper. Size 22 mm square. Per book.....	.25
33048.	Micro Labels, for slides, same as No. 33044, but rectangular. Size 22 x 15 mm Per book.....	.25
33052.	Micro Slide Box, for conveniently keeping clean slides to be withdrawn one by one as needed. For attaching on wall. For 3 x 1 inch slides.....	1.00
33056.	Micro Slide Mailing Cases, for slides 3 x 1 inches. Per dozen.....	.10
33060.	" Boxes, of white wood, popularly known as Pillsbury boxes, for twenty-five 3 x 1 slides.	
	Each.....	.08
	Per 100.....	6.00
33064.	" Slide Boxes, improved form, of selected wood, with lid fitting down over the outside of projection instead of inside as in No. 33060. Box is joined by superior method of gluing and is distinctly worth the difference in price.	
	Number.....	1924 1930 1932 1934
	Size of slides.....	3 x 1 1 1/2 x 1 3 x 2 3 x 1
	Capacity.....	12 25 25 25
	Per 10.....	.75 1.25 2.00 1.00
33068.	Micro Slide Box, for one hundred 3 x 1 slides. of wood covered with green book-binder's cloth, with hinged lid.....	.40



No. 33072-2016



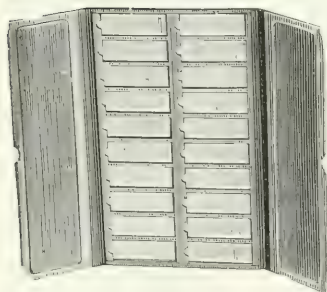
No. 33072-2020



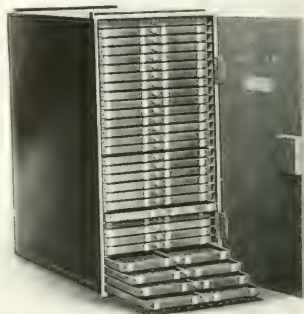
No. 33072-2023

33072. Micro Slide Cabinet, Bausch & Lomb, substantially made of mahogany, with drawer in bottom for card index. For 3 x 1 slides.

Number.....	2016	2020	2025
Capacity, slides.....	500	1500	3000
Each.....	12.00	25.00	50.00



No. 33076



No. 33080

33076. Micro Slide Trays of cardboard, in map form, holding twenty 3 x 1 slides..... 25  
 33080. Micro Slide Cabinet, Minot, of metal. The 30 trays each hold twenty-four 3 x 1 slides giving a total capacity of 720 slides..... 20.00

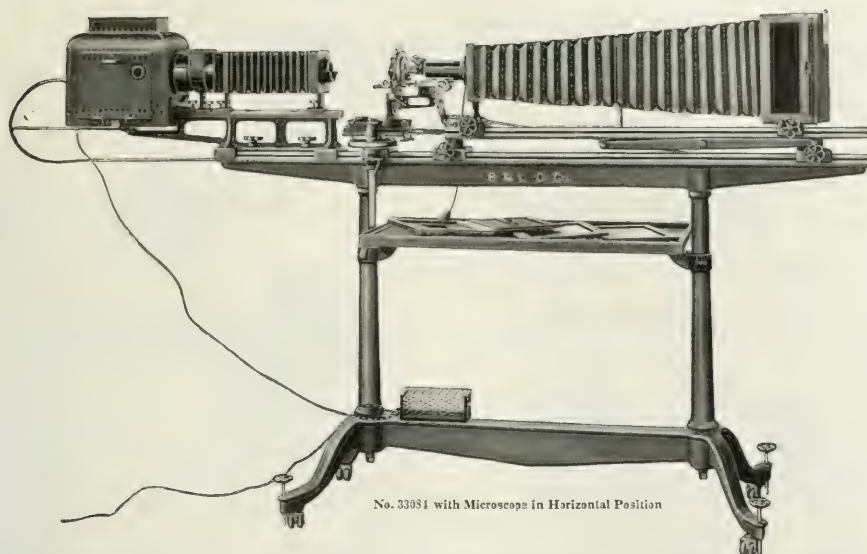


View in Stock Room



Office View Showing Section for Distribution of Catalogues





No. 33034 with Microscope in Horizontal Position

**MICRO-PHOTOGRAPHIC APPARATUS, BAUSCH AND LOMB, MODEL G, for Horizontal and Vertical Work, with and without Microscope.** Designed especially for general laboratory and research work in college, commercial institution or wherever photomicrographic work of the highest grade is desired. The new models presented here are the outgrowth of many years experience in developing and constructing apparatus of this general type with a view of obtaining the greatest possible stability and efficiency. Not only will this apparatus accommodate a wide range of magnifications, producing photomicrographs up to 8 x 10 inches in size, but it can also be used to advantage in photographing gross objects, in enlarging and reducing work and is thus an excellent laboratory camera. Its distinctive features are:

**Extreme rigidity.**

Constantly accurate alignment of parts, due to construction on single supporting stand with accurately planed optical beds, free from spring and vibration.

**Superior illuminating system.**

Convenient and effective adjustments.

Swing-out of microscope plate, permitting direct observation of object to be photographed through eyepiece.

Long range vertical adjustment of microscope plate, permitting use of any standard microscope.

Special camera box, providing for focusing on opaque screen in place of ground glass if desired.

Removable plate holder adapter, permitting long side of plate to be placed in either vertical or horizontal position.

Wide scope of adjustability and usefulness.

**Supporting Stand**—Of cast iron, massive construction, having base of four feet cast in one piece with heavy connecting rib, base has spread of 54 x 24 in., and is fitted with both castors and leveling screws; two upright supports carry main optical bed at height of 42 in., wooden shelf for accessories measuring 37 x 18 in. is mounted between upright supports.

**Optical Beds**—Three in number, of lathe type, carefully planed and accommodating supports for the different parts, which may be adjusted as desired and rigidly clamped; main bed, 78 in. (198.5 cm) long and 4½ in. (11.8 cm) wide, carries two supplementary beds—one adjustable carrying camera, and one stationary, bearing illuminating apparatus; adjustable bed 49 in. (124 cm) long and 4½ in. (11.8 cm) wide, can be set at any position from the horizontal to the vertical and rendered absolutely rigid by its supporting braces; both main and adjustable beds graduated in centimeters and millimeters with every fifth centimeter numbered; stationary bed is mounted on heavy casting which may be clamped to main bed at any desired point or removed without difficulty.

**Illuminant**—Two different electric illuminants are regularly listed with outfit—60° arc lamp, provided with long extension feeding device for adjusting from rear of camera box, or single-glower Nernst lamp for 110 or 230 volts; both lamps mounted either in large light-tight lamp house with observation windows and spring door or in smaller lamp house without door; both lamp houses, when furnished with arc lamp, provided with small mirror mounted near one of observation windows to serve as guide in feeding lamp from rear of camera box; 5-ampere, 110 volt rheostat mounted on base of stand, when arc lamp is furnished.

**Condensing System**—Apparatus is listed with two different condensing systems—complete and simple; complete consists of regular triple system, 4½ inch diameter, in Bausch & Lomb patent ventilated mount with water cell, bellows and standards mounted on stationary optical bed, front standard of bellows has special mounting carrying a 2½ inch diameter, 12 inch focus plano convex condensing lens for use with front lens of triple system removed, an iris diaphragm with 2½ inch opening and a trough for carrying yellow glass ray filter or cell for liquid filter, both of which are furnished with outfit; simple system consists only of this front standard with plano-convex lens, iris diaphragm and ray filters as described.

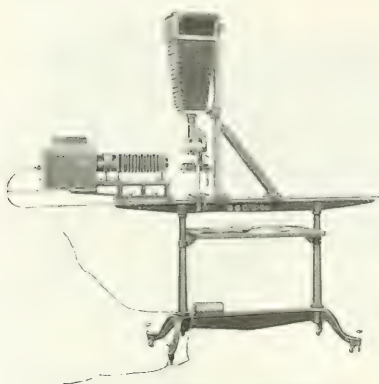
**Camera**—Consists of supports carrying tapering bellows with draw of approximately 40 in., having wire support in center; rear support carries box of neatly finished hard wood with door in side for use in focusing image on opaque white screen if desired; supplied with reversible adapter carrying laboratory plate holder for 8 x 10 plates and kits for smaller sizes, also with two focusing screens—one ground glass with clear center and one clear glass with graduated cross lines in center; hinged cover with two springs at rear of adapter permits plate holder to be placed in exact position without jarring apparatus; plate holder of special book form construction, ensuring exact registration.

**Shutter**—Bausch & Lomb automatic shutter, No. 4570, with steel leaves, having a maximum opening of 40 mm; may be set for instantaneous, bulb or time exposure; supplied with tube for making light-tight connection with microscope eyepiece.

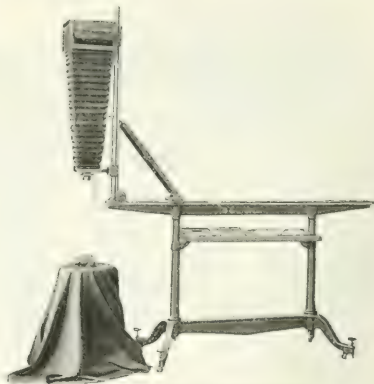
**Microscope Plate**—Of metal, 7½ x 5½ in., provided with three leveling screws to serve in bringing any microscope into exact alignment with optical axis of camera; fitted to main optical bed by clamping block and provided with vertical screw of 9 inch range, operated by hand wheel, for accommodation of varying center distances on different microscopes; so constructed that plate may be turned out 90° for locating field to be photographed by direct observation, and provided with a stop which brings it at once into alignment with optical axis of camera when turned back; support attached to plate carries universal joint and pulley with extension rod, by means of which fine adjustment of microscope, whether level, prism or side adjustment, can be controlled from rear of camera box.

Prices on following page.





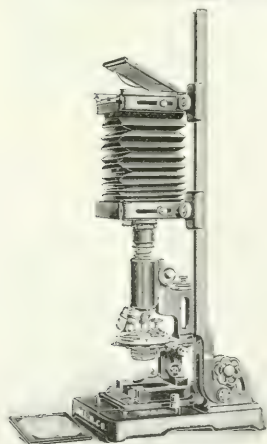
No. 33084 with Microscope in Vertical Position



No. 33084 Arranged for Macro-Photography

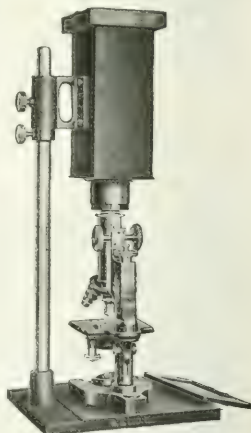
33084. **Large Micro-Photographic Apparatus**, as above described, complete with adjustable and stationary beds, arc lamp with adjusting rod, large light-tight lamp house, 5 ampere, 110 volt rheostat, complete condensing system, adjustable microscope plate with adjusting rod for microscope, camera and shutter as described. .... 300.00
33088. **Large Micro-Photographic Apparatus**. Same as No. 33084 but with Single-Glowers Nernst lamp in place of arc, rheostat and adjusting rod. .... 287.50
33092. **Large Micro-Photographic Apparatus**. Same as No. 33084 but with small lamp house and simple condensing system in place of complete. .... 280.00
33096. **Large Micro-Photographic Apparatus**. Same as No. 33092 but with Single-Glowers Nernst lamp in place of arc, rheostat and adjusting rod. .... 267.50
33100. **Automatic Arc Lamp**, will be furnished with any of the above outfits, in place of the hand-feed arc and adjusting rod, at an additional cost of. .... 57.50
33104. **Regular Double Plate Holder** for 8 x 10 plates, without reducing kits. .... 2.00
33108. **Regular Double Plate Holder**. Same as No. 33104, with reducing kits. .... 4.00
33112. **Special Single Laboratory Plate Holder**, bookform, for 8 x 10 plates, with reducing kits. .... 5.50

Note.—Special descriptive pamphlet sent on application. Because of the many possible combinations and arrangements of this outfit we suggest the sending of information as to requirements so that we may submit a table estimate on specific outfit.



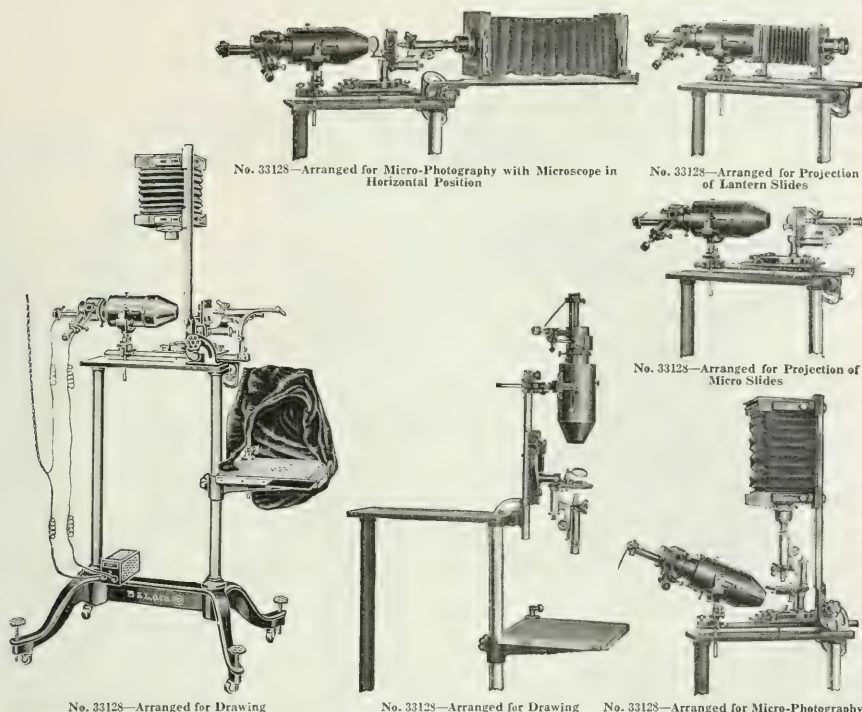
No. 33116

33116. **Micro-Photographic Camera, Bausch and Lomb, Model H.** The Camera is the same as furnished with the combined apparatus and is mounted on a similar optical bed, graduated to 640 mm. The bed is mounted by a strong hinge joint on a heavy metal base, 13 x 9 1/2 in.; may be adjusted in any position between the vertical and horizontal and secured by a clamp. The adjustments on the plate will accommodate any standard microscope. The outfit does not include an illuminating apparatus or shutter. .... 45.00



No. 33120

33120. **Micro-photographic Camera, Bausch & Lomb Model K**, a simplified outfit for quick operation. The plate holder will take 3 1/2 x 4 1/2 inch plates. The camera may be rotated in and out of the axis of the microscope as shown in illustration and the base may be utilized on the work table as a regular support for the microscope at all times so that the vertical rod and camera need only be added when photographs are to be made. .... 20.00
33124. **Automatic Shutter**, with maximum opening of 40 mm, for use with instantaneous, bulb or time exposure, and ready to attach to either Model H or Model K cameras as listed above. .... 10.00

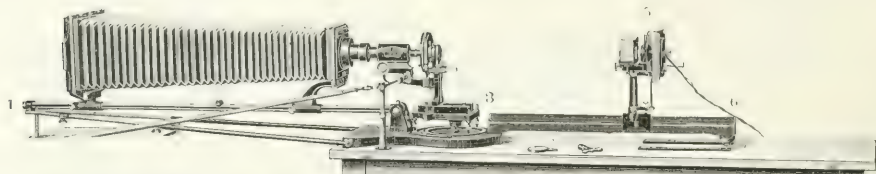


# **COMBINED DRAWING, MICRO-PHOTOGRAPHIC AND PROJECTION APPARATUS, BAUSCH AND LOMB,** for use with any regular microscope as used for ordinary work and providing for the following:—

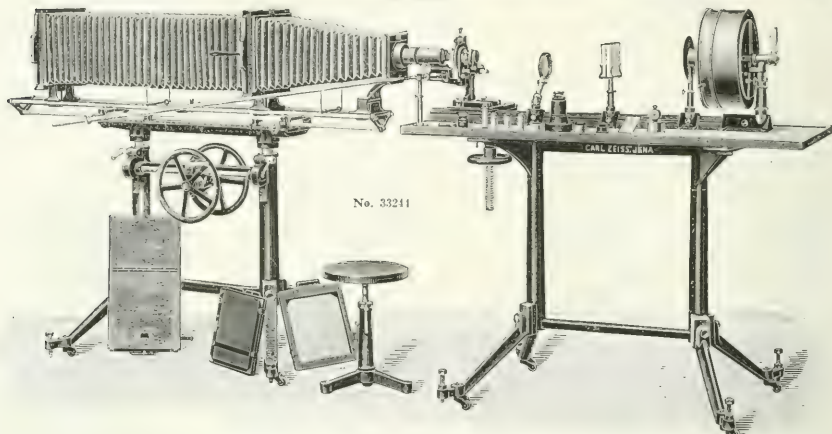
- Drawing with apparatus in horizontal position.
- Drawing with apparatus in vertical position.
- Photo-micrography with camera horizontal.
- Photo-micrography with camera vertical.
- Gross photography with Micro-Tessar objectives, without microscope but with special stage having micrometer movement.
- Gross photography of solid objects with regular photographic objectives.
- Microscopic projection.
- Lantern slide projection.
- Drawing of large opaque objects by addition of opaque attachment.
- Photo-micrography of opaque objects by addition of vertical illuminator.

- Supporting Stand**—Of cast iron, provided with both castors and leveling screws.
- Optical Beds**—Two in number, of lathe type, accommodating supports for different parts which may be adjusted as desired and rigidly clamped; one bed, graduated to 570 mm., carries illuminating accessories, microscope plate, and mirror, the other, graduated to 640 mm., carries camera; both are attached to base plate by strong hinge joints, permitting them to be adjusted in either horizontal or vertical position.
- Illuminant**—Either a hand-fed arc or single-glower Nernst electric lamp, as ordered, for use on direct or alternating current, enclosed in a small cylindrical hood with observation windows, attached to rear of condensing system mount; a rheostat is mounted on lower base of outfit equipped with the arc lamp.
- Condensing System**—Regular 4½ in. diam. triple condensing system in patent ventilated mount, which in turn is mounted in a cylindrical shaped metal hood, in which the condensers may be easily adjusted to and fro with reference to the lamp; a conical shaped extension slips on the front of the cylindrical shaped hood and helps to render the apparatus more nearly light-tight; diaphragms of three different apertures are furnished to cut off superfluous light and heat when desired; entire illuminating apparatus is carried by a special fork and standard, adjustable for height and also to and fro on the optical bed, and provided with coarse and fine adjustment screws for shifting its direction vertically or laterally.
- Camera**—Regularly supplied with camera for 4 x 5 in. plates, having a maximum bellows draw of 24 in., equipped with a double plate holder with reducing kits for 3½ x 4½ in. plates and a ground glass focusing screen with clear center; in adjustable mounting on two supports clamped to optical bed; front standard fitted with sliding light-tight tube to connect with microscope. A similar camera to take 5 x 7 in. plates can be supplied at an extra cost.
- Shutter**—Automatic with steel leaves, having a maximum opening of 40 mm.; may be set for instantaneous, bulb or time exposure.
- Drawing Board**—Of wood, neatly finished, 14 in. square, adjustable on front standard of supporting stand, which is graduated so that one can readily reset board at any particular position; supplied with velvet hood on adjustable standard to shield board from light.

33128.	Combined Drawing and Micro-photographic Apparatus, as described, with hand-feed arc lamp and 5 ampere rheostat for 110 volts without microscope .....	155.00
33132.	Combined Drawing and Micro-photographic Apparatus, but with 5 ampere rheostat for 220 volts. ....	157.50
33136.	Combined Drawing and Micro-photographic Apparatus, but with single-glower Nernst lamp in place of arc. Please to specify voltage when ordering .....	150.00



No. 33188



No. 33241

**MICRO-PHOTOGRAPHIC APPARATUS, ZEISS.** We list below two typical micro-photographic outfits, one on the basis of the Zeiss Combined Horizontal and Vertical Camera with Nernst light and one on the basis of the Large Micro-photographic Camera with Mercury Vapor Lamp. Equipment for micro-photography should be selected in every case with special reference to the sources of light available and the kind of work to be accomplished and we recommend that we be permitted to make specific quotation wherever possible. Zeiss *Mikro-264*, a 50 pp. catalogue devoted exclusively to micro-photographic equipment, will be sent upon request. Modern research has shown that the large sources of light of great current consumption are unnecessary if a proper condensing system be used, and where electric current is available we recommend for alternating current the Nernst lamp with iris diaphragm and where direct current is available the Weule arc lamp requiring only 5 amperes of current as compared with the 20 and 30 ampere lamps formerly used, or the new Mercury Vapor Lamp as shown in lower illustration. This Lamp furnishes an extraordinarily uniform and bright light, which with the aid of simple light filters is rendered monochromatic to a very perfect degree. The Zeiss Weule arc lamp with rheostat and condensing lens is applicable to either of the outfits listed below at the following prices:—

The most and the least, it is as applicable to either of the quantities listed below as the following prices.				
33140.	Weule Direct Current Arc Lamp, 5 amperes; with casing.		Duty Paid.....	66.00
	Duty Free.....	50.00		
33144.	Condensing Lens IC, on saddle stand with iris diaphragm		Duty Paid.....	19.80
	Duty Free.....	15.00		
33148.	Adjustable Resistance for 110 volts direct current.		Duty Paid.....	6.14
	Duty Free.....	4.65		

**Micro-photographic Outfit, Zeiss, on basis of Combined Horizontal and Vertical Camera (illustration shows Camera in horizontal position).** Without Microscope or equipment for same.

33156.	Combined Horizontal and Vertical Camera, for plates 7 x 9 inches	45.00	59.40
33160.	Two sets of kits for smaller plates	1.50	1.98
33164.	Focussing Glass	5.00	6.60
33168.	Remote Focussing Gear for attachment to Zeiss Stands with Berger fine adjustment	14.50	19.14
33172.	Optical Bench	5.00	6.60
33176.	Nernst Lamp on saddle stand, with Aplanatic Condenser and Iris diaphragm	26.25	34.65
33180.	Rheostat for above, for 110 volts alternating or direct current	2.50	3.30
33184.	Ray Filter, for attachment to the lamp, with glass cell	2.50	3.30
33188.	Complete Outfit, as above	102.25	134.97

**Micro-Photographic Outfit, Zeiss on basis of Large Camera with Mercury Vapor Lamp, for direct current only** Without Microscope or equipment for same.

33192.	Large Camera, with cast iron stand for raising and lowering. For plates 10 x 12 inches	77.50	102.30
33196.	Three sets of kits for smaller plates	2.25	2.97
33200.	Focussing Lens	6.50	8.58
33204.	Projection Table, with optical bench mounted on rigid cast iron stand	25.00	33.00
33208.	Elevating Support for the microscope when it is to be used in upright position	13.00	17.16
33212.	Reflecting Prism, with sleeve for attachment to the camera when Microscope is to be used in vertical position	5.00	6.60
33216.	Remote Focussing Gear	12.75	16.83
33220.	Mercury Vapor Quartz Lamp, for 4 amperes direct current	32.50	42.90
33224.	Light-proof Lamp Casing, for above, on saddle stand so arranged that no injury can result from ultra-violet radiation	27.50	36.30
33228.	Rheostat for 110 volts	6.25	8.25
33232.	Condenser IB on saddle stand with screen disc	7.50	9.90
33236.	Iris Diaphragm, on saddle stand	7.50	9.90
33240.	Ray Filter, on saddle stand, with two cells	9.00	7.82
33244.	Complete Outfit, as above	229.25	302.61



No. 33336

**MICRO-PHOTOGRAPHIC OUTFIT FOR ULTRA-VIOLET LIGHT, ZEISS.** The special effects obtainable by the application of ultra-violet light to micro-photography are mainly as follows:—

**Resolving power.** In a microscope objective this increases in direct proportion to any decrease in the wavelength of the light used. With the quartz objective in this arrangement the resolving power is about doubled as compared with an objective of identical numerical aperture when made of glass and operated with daylight.

**Permeability.** Many colored organic objects, both in the fresh and preserved state, display considerable variation in their degree of permeability under ultra-violet light when they show no sign of color in white light.

**Physiological effects.** These are sometimes very pronounced upon living organic objects.

The objectives employed are the monochromats of quartz, corrected for wavelength  $275 \mu$  and with a numerical aperture of the high power 1.25. The entire optical system including slides, cover glasses, etc., must be of fused quartz or of glass permeable to the ultra-violet ray. The monochromatic objectives of quartz cannot be used with light of a different wavelength, such as daylight, nor can they be used with an immersion fluid differing in composition or having a refractive index other than that as supplied with each objective. The outfit consists essentially of a Cadmium arc as a source of light which is actuated by the secondary circuit from an induction coil. The beam of wavelength  $275 \mu$  from this sort of light is made available by quartz prisms and this beam, after passing through a quartz condenser lens, is used as a source of illumination for the microscope. As the ultra-violet of this wavelength is totally invisible to the eye, fluorescence screens must be used in order to find suitable field, etc. A list (*Zeiss Mikro 237*) of the complete literature referring to the use of this interesting method, and also *Mikro 170* giving more detailed information as to the outfit is sent upon request. The outfit listed below is the latest arrangement offered by the firm of Carl Zeiss.

		Duty Free	Duty Paid.
33348.	Cast Iron Base Plate, with slides for the microscope.....	9.00	11.88
33352.	Vertical Camera.....	23.75	31.35
33356.	Adapter, with time shutter.....	1.00	1.32
33360.	2 Sheets for 9 x 12 cm. plates.....	.75	.99
33364.	Dark Slide, for two 9 x 12 cm. plates, with diaphragm to insert into the register of the camera.....	8.75	11.55
33368.	Searcher, with quartz objective, fluorescent screen and 12 x magnifier for direct observation.....	12.50	16.50
33372.	Carrier for the Searcher, with sleeve and clamping screw to fix it on the rod of the vertical camera.....	1.25	1.65
33376.	Totally Reflecting Prism of quartz, in sliding sleeve.....	6.25	8.25
33380.	Monochromatic Objective 6 mm, 0.35 N.A.....	50.00	62.00
33384.	" " 2.5 mm, 0.85 N.A.....	100.00	124.00
33388.	" " 1.7 mm, 2.50 N.A.....	150.00	186.00
33392.	Achromatic Objective A.....	5.00	6.20
33396.	Quartz Eyepieces 5, 7, 10, 14 and 20.....	37.50	46.50
33400.	Huyghenian Eyepiece 2.....	1.50	1.86
33404.	Sliding Objective Changer for the three Monochromatic and the Achromatic Objective A.....	10.00	12.40
33408.	Mahogany Case, with lock and key, for 6 objective slides and objectives attached.....	3.75	4.65

(Outfit continued on following page.)



**Micro-Photographic Outfit for Ultra-Violet Light, Zeiss (continued)**

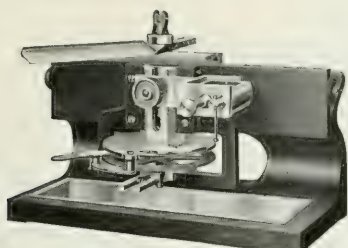
	Duty Free	Duty Paid
33112. Quartz Condenser, with iris diaphragm and with a single front and a duplex front, interchangeable.....	17.50	23.10
33116. Centering Appliance for the quartz condenser, or for objectives which are to be used as condensers.....	3.00	3.96
33120. Screen, of Uranium Glass, to insert into the diaphragm carrier of the Abbe illuminating apparatus, with roiled circle.....	2.00	2.64
33121. Rectangular Plane Mirror, to place on the foot of the microscope stand.....	.38	.49
33128. 4 Object Slides of quartz, ground vertical to the optical axis, 0.5 mm thick, size 25 x 30 mm each.....	4.50	5.58
33132. 10 Object Slides of U V Glass, about 0.2 to 0.3 mm thick, size 20 x 30 mm.....	3.50	6.20
33136. 5 Aluminum Slides, as designed by Heidenhain.....	2.50	3.10
33140. 5 Cover Glasses, of fused quartz.....	3.75	4.65
33441. Stage Micrometer, 1 mm divided into 100 parts, on quartz slide under a cover glass of fused quartz with one Heidenhain aluminum slide.....	5.00	6.20
33448. Stand III E with large mechanical stage, 1.40 N.A.....	91.25	113.15
33452. Horse shoe cast iron Base Plate.....	2.50	3.10
33456. Short Optical Bench, with three set screws and column for the collector.....	5.00	6.60
33460. Spark Stand, for horizontal electrodes.....	20.00	26.40
33464. Projection Lens Carrier, with slide for the collimator, on saddle stand, without micrometrical movement.....	3.50	4.62
33468. Collimator of quartz, of long focus.....	6.25	8.25
33472. Prism Platform with two prism mounts screwed upon it, on saddle stand.....	5.75	7.59
33476. 2 Prisms of quartz, refractive angle 60°, with refractive surface about 3 cm high and 5 cm wide, inclined by 60° to the optical axis of the crystal.....	25.00	33.00
33480. 10 meters Cadmium Wire.....	2.50	3.30
33484. 10 meters Magnesium Tape.....	.75	.99
33488. Induction Coil, series H3, without condenser.....	45.00	59.40
33492. Electrolyte Contact Breaker, Simon, with porcelain nozzle.....	11.25	14.85
33496. Resistance Coil.....	12.00	15.84
33500. Amperemeter, Type AG, for 1 to 5 amperes, aperiodic.....	9.98	13.17
33504. Switch, for cut-off.....	1.75	2.31
33508. Fluorescent Screen, 3 x 9 cm.....	.38	.50
33512. Condenser, consisting of two Leyden jars.....	11.25	14.85
33516. Burner.....	6.25	8.25
33520. Table top and case for the illuminating apparatus.....	12.50	16.50
33524. Switch-board.....	35.00	46.20
33528. Wire and montage.....	12.50	16.50
33532. Support for the camera.....	4.25	5.61
33536. Complete Micro-photographic Outfit for Ultra-violet Light, as above listed.....	785.73	1037.15

**ACCESSORIES FOR USE WITH MICRO-PHOTOGRAPHIC OUTFITS.**

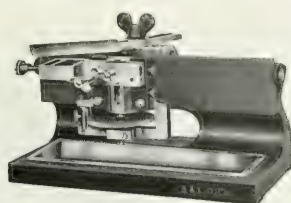
33540. Micro-Tessar Objective, Bausch & Lomb, Zeiss, constructed after the formulae of the large photographic lenses of the same name and particularly well adapted to photo-micrography. The angle of view is 55°, the illumination is uniform and the definition remarkably sharp. Each is mounted with a metal iris diaphragm and provided with a society screw. 72 mm equivalent focus.....		32.00
33544. Micro Tessar Objective. Same as above, but with 48 mm equivalent focus.....		26.00
33548. Micro Tessar Objective. Same as above, but with 32 mm equivalent focus.....		26.00
33552. Doublet Focusing Glass.....		4.00
33556. Achromatic Focusing Glass.....		8.00
33560. Light Filters, Wratten and Wainwright, Set of 9, etc., for micro-photography, cemented between glass, 2 inches square.		
Duty Free.....	8.10	Duty Paid..... 11.10



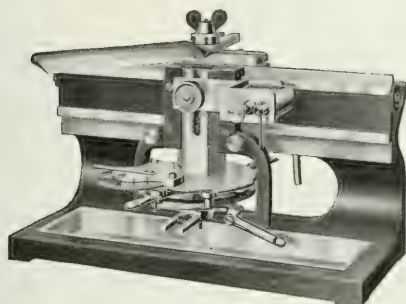
View in Salesroom Showing Microscopes, and Accessories, Apparatus for Cement and Asphalt Testing, etc.



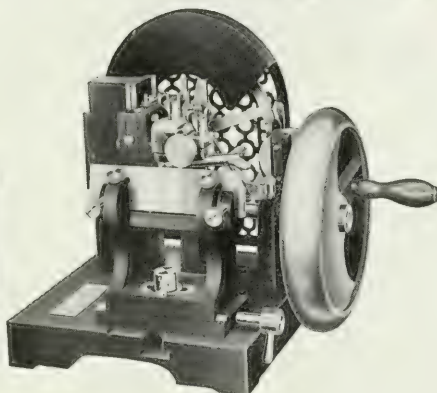
No. 33612



No. 33600



No. 33624



No. 33636

# MICROTOME, STUDENT, BAUSCH AND LOMB, suitable for individual and elementary laboratory use.

**Feeding Mechanism**—Operated by hand; consists of accurately cut micrometer screw of 0.5 mm pitch, provided with a disc graduated into 100 parts each equal to 5 microns, the edge having 100 teeth which engage with a click and secure perfect control of the feed; whole supported in a metal stirrup, permanently attached to front of stand.

**Object Clamp**—Of one piece, extremely rigid; when fully extended will accommodate objects measuring 30 x 22 mm; adjustable vertically and orienting in one plane; may be attached at either side of vertical slide for paraffin or celloidin works.

**Dimensions**—Length, 240 mm; width, 127 mm; height, 146 mm.

**Possible Attachments**—Microtome regularly furnished without knife; plain knife No. 33744, 90 mm, with holder No. 33772 or shanked knife No. 33752 are recommended; CO<sub>2</sub> Freezing attachment can be fitted to this instrument.

33600.	Student Microtome, without knife and holder, as described	22.00
33604.	Plain Microtome Knife 90 mm, without handle, in case, but with No. 33772 Knife Holder	5.00
33752.	Shanked Microtome Knife, 90 mm, in case	5.00

# MICROTOME, MEDIUM LABORATORY, BAUSCH AND LOMB, as widely used in hospital laboratories.

**Feeding Mechanism**—Operated by convenient hand lever; can be set by simple movement of the quadrant to feed any thickness from 2 to 60 microns, in steps of 2 microns; provided with split nut which releases carriage at any point of feed, enabling it to be returned to any point at once; whole supported in metal stirrup permanently attached to front of stand.

**Object Clamp**—Of one piece, extremely rigid; when fully extended will accommodate objects measuring 35 x 32 mm, adjustable vertically and orienting in one plane; can be set at either side of the vertical slide for paraffin or celloidin works.

**Dimensions**—Length, 300 mm; width, 143 mm; height, 188 mm.

**Case**—Microtome supplied in strong wooden box with handle.

**Possible Attachments**—Microtome regularly furnished without knife; plain knife No. 33744, 125 mm, with holder No. 33772 or shanked knife No. 33752, 125 mm, are recommended; CO<sub>2</sub> Freezing attachment can be fitted to this instrument, as can the Naples Universal Clamp.

33612.	Medium Laboratory Microtome, without knife and holder, as described	45.00
33616.	Plain Microtome Knife, 125 mm, without handle, in case, but with No. 33772 Knife Holder	6.50
33752.	Shanked Microtome Knife, 125 mm, in case	6.75

# MICROTOME, AUTOMATIC LABORATORY, BAUSCH AND LOMB, a most satisfactory form of the sledge type of Microtome for general use. A special feature is the lateral adjustability of the feeding mechanism along the entire front of the stand, providing for different cutting angles and stroke lengths. The feeding is either automatic or by hand as desired.

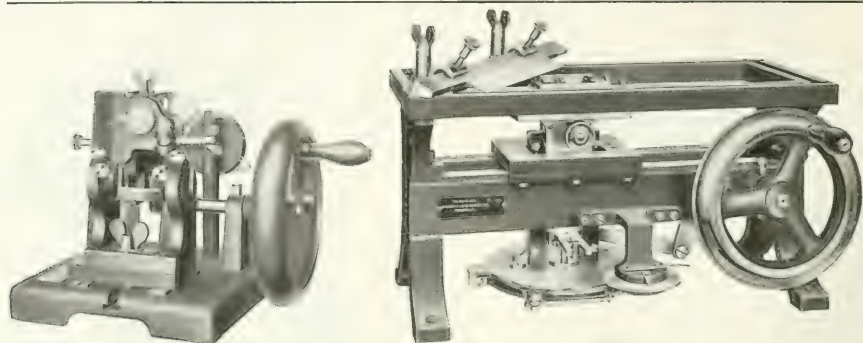
**Feeding Mechanism**—Automatically operated with stroke of knife by arm extending from rear of knife block—also provided with lever for hand feeding; controlled by adjustable cam with graduated knurled button and spring click, giving feed of 2 to 36 microns in steps of 2 microns; provided with split nut having convenient handles and with releasing lever, enabling carriage to be released at any point of feed and to be set at any desired position on the feed instantaneously; whole supported in a metal stirrup adjustable laterally along front of stand and secured in any position by clamping screws.

**Object Clamp**—Of one piece, extremely rigid; engages rigidly with slide; when fully extended will accommodate objects measuring 35 x 32 mm; adjustable vertically and orienting in one plane; can be set at either side of the vertical slide for paraffin or celloidin works.

**Dimensions**—Length, 344 mm; width, 158 mm; height, 218 mm.

**Possible Attachments**—Microtome regularly furnished with knife; plain knife No. 33744, 165 mm, with holder No. 33772 or shanked knife No. 33752, 165 mm, are recommended; Ether Freezing attachment can be fitted to this instrument, as can the Naples Universal Clamp.

33624.	Automatic Laboratory Microtome, without knife, as described	65.00
33628.	Plain Microtome Knife, 165 mm, without handle, in case and No. 33772 Knife Holder	8.00
33752.	Shanked Microtome Knife, 165 mm	8.00



No. 33644

No. 33652

**MICROTOME, MINOT ROTARY, BAUSCH AND LOMB**, as designed by Dr. Charles S. Minot of Harvard University and improved from time to time during the past twelve years. The most widely used and satisfactory instrument for paraffine cutting. (See illustration on preceding page.)

**Feeding Mechanism**—Consists of a micrometer screw revolved by a large ratchet wheel which engages a pawl; amount of feed controlled by a cam; wheel provided with knurled head which permits fine adjustment of object in relation to knife with pawl disengaged and held off wheel by spring catch; cam disc graduated in single microns, numbered from 0 to 25, and operated by knurled head; micrometer screw fitted with split nut provided with handles and releasing lever, by means of which feed can be instantly brought to beginning, or any intermediate position, and held; feed wheel protected by strong iron guard of neat design.

**Object Holder**—Consists of disc 25 mm in diameter, adjustable in mounting which permits of orientation to give any desired cutting angle; securely held in position by convenient screws; moves on a vertical slide actuated by a crank operated by a heavy balance drive wheel with handle and stopped when desired by convenient locking device.

**Knife Block**—Consists of heavy iron casting which is attached to base and holds knife in fixed position; adjustable to and from object and from side to side to permit use of entire cutting edge; knife clamp may also be tilted in its support to set angle of cutting edge as desired.

**Dimensions**—Length, 196 mm; width, 212 mm; height, 214 mm.

**Case**—Supplied in strong wooden box with handle.

**Possible Attachments**—Regularly without knife, unless otherwise specified; knife No. 33744, 125 mm blade, without handle is recommended and can be included at its additional cost; rotary object clamp, No. 33732 or No. 33728, can also be attached, and the ribbon carrier, No. 33720.

33636.	Minot Automatic Rotary Microtome, without knife, as described with three object discs.....	75.00
33744.	Knife, 125 mm blade, without handle in case.....	4.75

**MICROTOME, MINOT SIMPLIFIED ROTARY, BAUSCH AND LOMB**, designed to meet the demand for a Rotary Microtome at less expense than the original Rotary No. 33636.

**Feeding Mechanism**—Consists of a micrometer screw revolved by a ratchet wheel which engages a pawl; amount of feed controlled by a cam; wheel provided with a small handle, permitting fine adjustment of object in relation to knife with pawl disengaged and held off wheel by spring catch; cam disc graduated in steps of 2½ microns, up to 25 microns, and operated by large knurled head.

**Object Holder**—Consists of disc 25 mm in diameter, having fixed ball on stem universally adjustable in socket holder; can be oriented to give any desired cutting angle and securely clamped in place by convenient screw; stem of disc projects through holder permitting convenient adjustment from the rear, holder moves on a vertical slide actuated by a crank which is operated by a heavy balanced drive wheel with handle and stopped by a convenient locking device. Object holder on Minot Automatic Rotary Microtome No. 33636 can be substituted for that above if desired.

**Knife Block**—Consists of heavy iron casting which is attached to base and holds knife in fixed position; adjustable to and from object and from side to side to permit use of entire cutting edge; knife clamp may also be tilted in its support to set angle of cutting edge as desired.

**Dimensions**—Length, 196 mm; width, 212 mm; height, 203 mm.

**Case**—Supplied in strong wooden box with handle.

**Possible Attachments**—Regularly furnished without knife, unless otherwise specified; knife No. 33744, 90 mm blade without handle is recommended; rotary object clamp, No. 33732 or No. 33728 can be attached, as can also the adjustable knife holder.

33644.	Minot Simplified Automatic Rotary Microtome as described, without knife and with three object discs.....	40.00
33744.	Knife, 90 mm blade, without handle, in case.....	3.50

**MICROTOME, MINOT AUTOMATIC PRECISION, BAUSCH AND LOMB**. This microtome, designed and recently improved under the supervision of Dr. Minot is unexcelled, we believe, for all around work of the most accurate nature. It is intended for very precise section cutting of large specimens, either paraffin or celloidin, but can be used for serial work as well and has given eminent satisfaction in some of the most exacting laboratories of the world.

**FEEDING MECHANISM**—Consists of a micrometer screw with an available feeding length of 38 mm, turned by a large ratchet wheel which engages a pawl and is controlled by a cam; cam disc graduated in single microns, numbered from 0 to 25, and operated by knurled head, micrometer screw fitted with our split nut provided with handles and releasing lever, by means of which feed can be instantly brought to beginning, or any intermediate position, and held; feed wheel protected by metal cover of neat design. With rack and pinion device for raising and lowering object clamp.

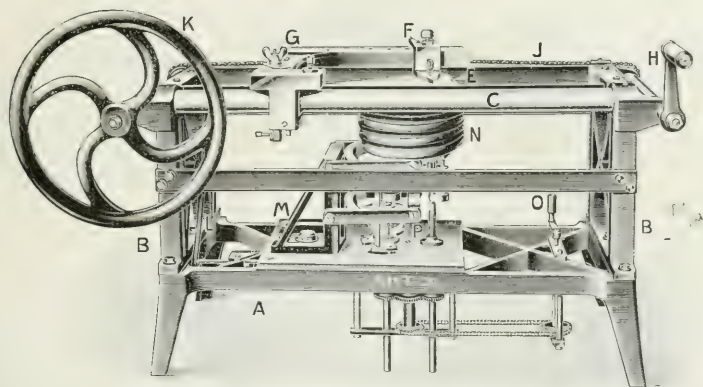
**KNIFE SUPPORT**—Consists of oblong frame, carefully machined, with T-slot on all four sides and having two knife clamps movable in slots to place knife at any horizontal angle with relation to object.

**DIMENSIONS**—Length, 405 mm; width, 194 mm; height, 245 mm.

**POSSIBLE ATTACHMENTS**—Micrometer regularly furnished without knife; Minot knife, No. 33660 is listed for use with this model; adjustable knife clamps No. 33664 for tilting; Zabriskie object clamp No. 33656, can also be attached, as can the ribbon carrier, No. 33724.

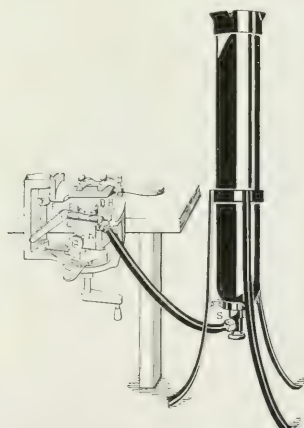
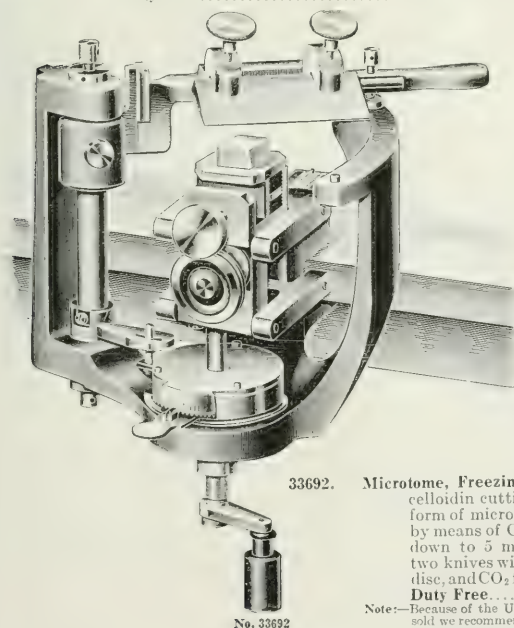
33652.	Minot Automatic Precision Microtome, without knife, as described.....	125.00
33656.	Zabriskie Clamp for large objects, for use with above Microtome only.....	15.00
33660.	Minot Knife, length 315 mm, in case.....	15.00
33664.	Tilting Knife Clamps for Precision Microtome.....	7.50
33668.	Minot Automatic Precision Microtome, with Zabriskie Clamp for objects 100 x 80 mm and less and with special clamps for elevating and tilting knife, as used at Rockefeller Institute for Medical Research, Neurological Institute and College of Physicians and Surgeons of New York City, etc. Complete	147.50





No. 33672

- 33672. Microtome, Large Brain, Sartorius,** for cutting whole brain sections to a thickness of 15 microns. As used in leading neuropathological laboratories in both the United States and Europe. Will take a preparation 210 x 210 mm. The sectioning is done by the celloidin method and the knife operates under the surface of the alcohol. Special CO<sub>2</sub> freezing device may be used in connection with this microtome for freezing whole brain sections at extra price. Price includes one knife 45 cm long and wooden table for the microtome.
- |   |        |           |        |
|---|--------|-----------|--------|
| Duty Free   | 420.00 | Duty Paid | 560.00 |
| <b>33676. Knife and Clamp</b> to hold same in rectangular position for paraffin sections. |        | Duty Paid | 40.00  |
| Duty Free   | 30.00  |           |        |
| <b>33680. Extra Knife, 45 cm long for celloidin.</b>                                      |        | Duty Paid | 28.80  |
| Duty Free   | 21.60  |           |        |
| <b>33684. Object Disc, regular.</b>   |        | Duty Paid | 20.00  |
| Duty Free   | 15.00  |           |        |
| <b>33688. Object Disc, with clamp.</b>  |        | Duty Paid | 28.00  |
| Duty Free   | 21.00  |           |        |


No. 33692—Attached to CO<sub>2</sub> Cylinder No. 29548

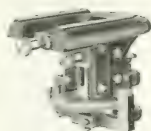
- 33692. Microtome, Freezing, Sartorius,** suitable for both paraffin and celloidin cutting but widely used as the most convenient form of microtome for quick sectioning of specimens frozen by means of CO<sub>2</sub>. With automatic adjustment for sections down to 5 microns in thickness. Including object clamp, two knives with box and springback for honing, embedding disc, and CO<sub>2</sub> freezing attachment but without CO<sub>2</sub> Cylinder.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 37.25 | Stock | 50.00 |
|-----------|-------|-------|-------|

Note:—Because of the U. S. law requiring registration of cylinders in which CO<sub>2</sub> is sold we recommend the use of U. S. Standard Cylinders. See p. 252.

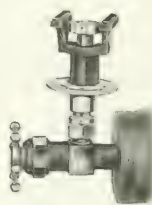




No. 33696



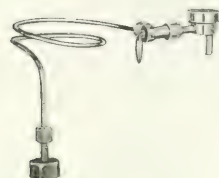
No. 33700



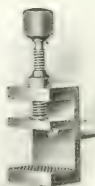
No. 33704



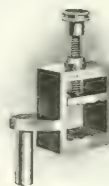
No. 33720



No. 33712



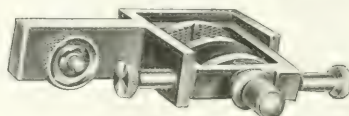
No. 33728



No. 33732



No. 33736



No. 33740

33696. **Microtome, Hand, Bausch & Lomb.** This convenient little microtome is carefully made and neatly finished. While designed primarily for cutting sections of stems and roots, it can be used for both animal and vegetable tissues. The feed is accurate and effected by means of a micrometer screw, the collar of which is graduated in steps of 25 microns each. Without knife. . . . . 6.00
33700. **Microtome, Table, Bausch & Lomb.** This model attaches securely to a table edge or similar support and is adapted to all kinds of sectioning for thicknesses of 5 microns and over. It is used largely in work preliminary to surgical operations and by students in ordinary laboratory work. Without knife. . . . . 12.50
33704. **Microtome Bardeen CO<sub>2</sub> Freezing, Bausch & Lomb.** This instrument was originally designed by Prof. C. R. Bardeen, formerly of Johns Hopkins University, now of the University of Wisconsin. It is indispensable for clinical work where sections of morbid tissues are required during an operation. The knife slides on glass guides. The finest feed is 20 microns. The object disc is scored concentrically and measures 36 mm in diameter. The microtome may be attached directly to a CO<sub>2</sub> cylinder. We recommend for use with this microtome a special knife No. 33708 with handle to fit the hand. Without knife. . . . . 16.00
33708. **Special Knife.** . . . . 4.00
33712. **CO<sub>2</sub> Freezing Attachment.** The freezing device in this attachment consists of a small metal cylinder. The object is placed on the flat disc top of the cylinder, which measures 36 mm in diameter, and is frozen by the expansion of the CO<sub>2</sub>. This device is connected with the gas cylinder by a flexible copper tube, provided with a connecting nut for joining to the cylinder and the necessary adapter for fitting to the microtome. We furnish it also with an extra valve, which can be placed at either end of the tube. This attachment may be used with Students, Medium Laboratory, Automatic Laboratory or Table Microtomes. Complete with valve, but without cylinder of CO<sub>2</sub>. . . . . 9.00
33716. **CO<sub>2</sub> Freezing Attachment** as above but without valve. . . . . 7.50
33720. **Ribbon Carrier,** for attaching to the knife block of either of the Minot Rotary Microtomes as shown in the illustration and is very useful in serial sectioning. The ribbon is of silk 40 mm wide, mounted on rollers and is easily operated by a knurled head. . . . . 7.50
33724. **Ribbon Carrier,** same as above, for attaching to Precision Microtome. . . . . 7.50
33728. **Object Clamp,** for Rotary Microtomes, to replace embedding disc. With closed back and open sides. Will take an object 26 mm thick. . . . . 3.00
33732. **Object Clamp,** as above, but with closed sides. Will take an object 28 x 26 mm. . . . . 3.00
33736. **" " Coplin,** for Rotary Microtomes. Provides extreme rigidity and will take a block 32 x 29 mm. . . . . 4.00
33740. **Object Clamp, Naples Universal** for the Automatic and Medium Laboratory Microtomes. Will accommodate a block 35 x 32 mm. . . . . 15.00

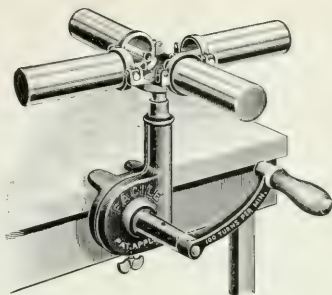




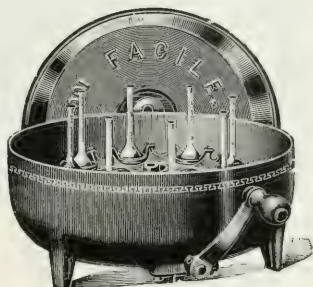




No. 33932

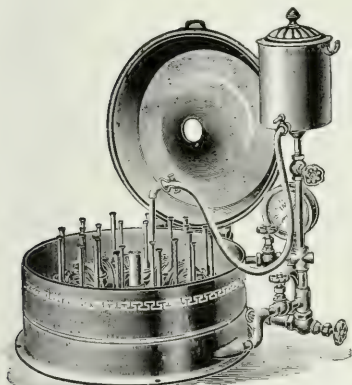


No. 33936

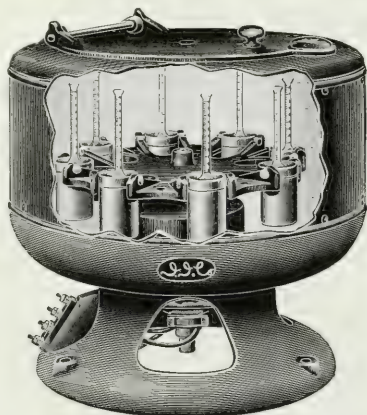


No. 33940

33924.	Lactometer, same as No. 33920 but 210 mm long.	.60
33928.	" " " No. 33924 but with thermometer.	1.50
33932.	Lactoscope, Feser, for determining the amount of fat in milk by its degree of translucency. With graduated pipette, in polished wooden case, complete with directions for use.	4.50
33936.	Milk Tester, Babcock, fitted with deep, seamless brass tubes and malleable iron tinned head. Operates easily, without vibration or jar and may be readily attached to any table or bench. Complete with full set of glassware, consisting of test bottles, pipette, acid measure, bottle brush and bottle of acid. With directions for use.	2 4
	Number of tubes.....	4.00 5.00
33940.	Milk Tester, Babcock, for hand operation, enclosed in cast iron case with cover. Operates easily and noiselessly at high speed. With complete set of glassware and directions for use.	6 8 10 12
	Number of bottles.....	9.00 10.00 12.00 14.00
	Each.....	



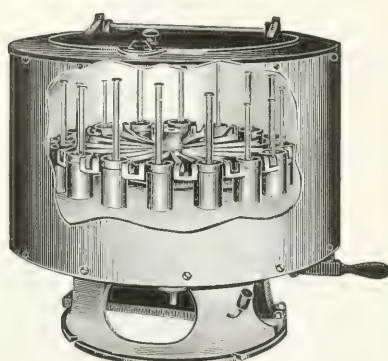
No. 33944



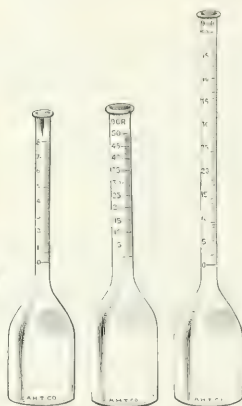
No. 33948

33944.	Milk Tester, Babcock, same as No. 33940, but for operation with steam turbine.	
	Number of bottles.....	12 18 24
	Each.....	25.00 27.50 30.00
33948.	Milk Tester, Babcock, International Electric Size 1, 8-Bottle. These are of same construction as the International Electric Centrifuges, for which the Babcock heads listed and shown here are interchangeable. With 8 trunnion buckets and with speed control rheostat but without glassware or heater.	
	Current.....	110 volts d. c. 220 volts d. c. 60 cycles 60 cycles
	Each.....	54.00 58.00 60.00 65.00





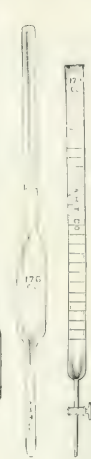
No. 33952



No. 33964

No. 33968

No. 33968



No. 33972

No. 33974



No. 33976



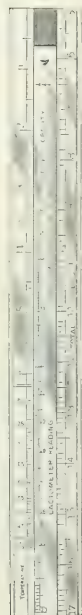
No. 33980



No. 33988

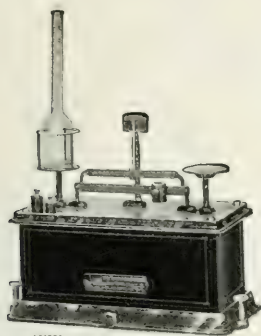


No. 33992

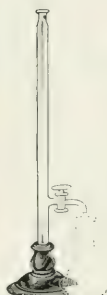


No. 34000

33952. Milk Tester, Babcock, International Electric Size 2, 16-Bottle. The cups regularly furnished with this machine carry all the usual styles of 7 inch Babcock test bottles and, in addition the 9 inch cream test bottles may also be used. With 16 trunnion buckets, speed control rheostat and mechanical brake, but without glassware or heater.
- |              |                 |                 |                 |                 |
|--------------|-----------------|-----------------|-----------------|-----------------|
| Current..... | 110 volts d. c. | 220 volts d. c. | 110 volts a. c. | 220 volts a. c. |
| Each.....    | 76.00           | 80.00           | 105.00          | 107.00          |
33956. Milk Tester, Babcock, International Electric Size 2, 24-Bottle. This is a modified form of the regular Size 2 Centrifuge, but of greater height, i.e., 40 inches and weighing about 200 lbs. With 24 buckets, speed control rheostat and mechanical brake but without glassware or heater.
- |              |                 |                 |                 |                 |
|--------------|-----------------|-----------------|-----------------|-----------------|
| Current..... | 110 volts d. c. | 220 volts d. c. | 110 volts a. c. | 220 volts a. c. |
| Each.....    | 125.00          | 130.00          | 140.00          | 145.00          |
33960. Electric Heater for International Milk Testers, for convenience in heating the test bottles while in the centrifuge, operating on the same current as the motor.
- |  |       |       |       |
|--|-------|-------|-------|
| For Milk Tester Number.....            | 33948 | 33952 | 33956 |
| Price of Electric Heater attached..... | 11.50 | 12.50 | 12.50 |
- Glassware for Babcock Test, in accordance with the specifications formulated by the U. S. Bureau of Standards for standard Babcock glassware and adopted by the Official Dairy Instructors Association.
33964. Milk Test Bottle, 8%, 18 grams, so-called "6 inch" bottle. Each..... .25
33968. Cream Test Bottle, 50%, 9 grams. Length, inches..... 6 9
- Each..... .40 .45
33972. Pipette, Babcock, delivering 17.6 cc in 5 to 8 seconds at 20° C. Each..... .20
33976. Skim Milk Bottle, double bore, Patent. Graduated in..... 30% 100%
- Each..... .50 .50
33980. Acid Measure, 17.5 cc..... .10
33984. Acid Burette. Number of 17.5 cc charges..... 3 6 12 25
- Each..... 2.00 2.00 2.50 3.00
33988. Combined Acid Bottle and Pipette. For storing acid and delivering charges of 17.5 cc..... 5.00
33992. Milk Tester, Heeren (Pioscopel), for determining the richness of milk by comparison with standard colors..... 1.00
33996. Paper, Schleicher & Schüll, No. 571, fat extracted for milk analysis. See M. A. Adams, "Analyst," 1885, p. 46. In strips 56 x 65 mm. Per 50 strips..... 1.75
34000. Slide Rule, Richmond, for calculating the total solids in milk..... 4.00



No. 40300



No. 40304



No. 40308



No. 40312

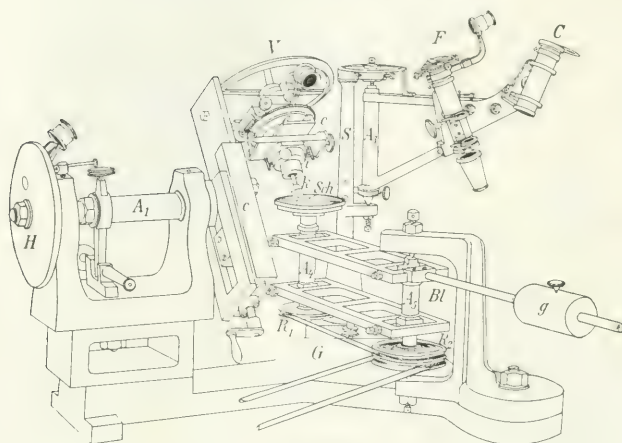
40300. Balance, Torsion, for cream test, with sliding tare weight, weight pan, special bottle holder and arrest; sensibility 1 centigram; with special 9 and 18 gram weights.  
For, bottles..... 1 2 4  
Each..... 12.00 13.00 15.00
40304. Fat Extraction Tube, Röhrig, for use in the Rose-Gottlieb method; 46 cm high with a capacity to base of neck of 87½ cc. The delivery tube with stopcock is so placed that its center line coincides with the surface of 23 cc of liquid in the main tube. With polished wooden base with indentation for flask, but without flask as shown in illustration. As used in the Dairy Laboratory, Bureau of Chemistry of the U. S. Department of Agriculture..... 2.25
40308. Galactometer, Adam, with two bulbs and glass stopcock..... 2.50
40312. Automatic Reckoner, Ackermann, for dry substances in milk, with directions..... 2.00



View in Salesroom showing special stands for the display of Beakers, Flasks, etc.

## MINERALOGY, CRYSTALLOGRAPHY, PETROGRAPHY, ETC.

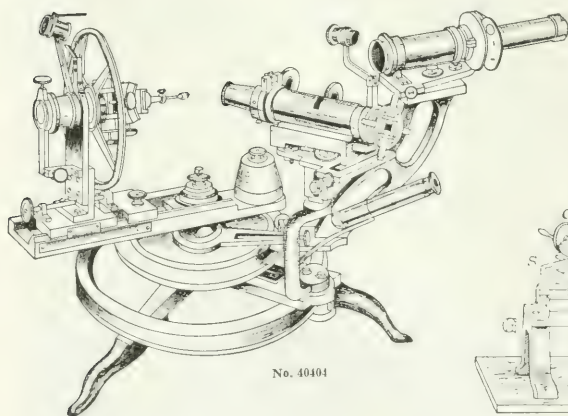
Note—We are enabled to offer by special arrangement with the maker, the optical measuring instruments for Crystallography as designed by Prof. Victor Goldschmidt, of Heidelberg. Original catalogue is sent on application.



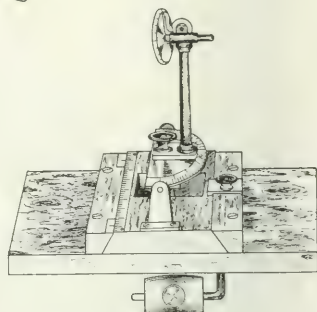
No. 40400



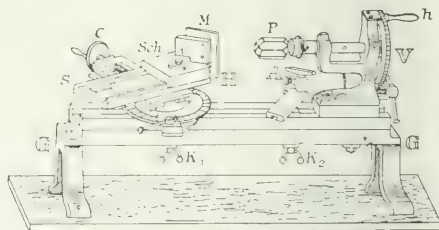
No. 40416



No. 40404

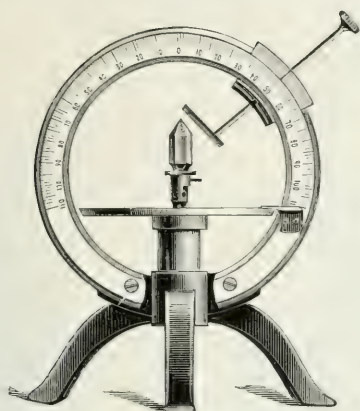


No. 40424



No. 40420

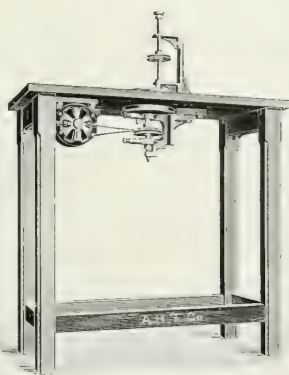
		Duty Free	Duty Paid
40400.	Goniometer, Grinding, Goldschmidt, complete as described in <i>Zeitschr. für Krystallogr.</i> 1912, Bd. 51, Seite 359.....	690.00	920.00
40404.	Goniometer, Two-Circle type, Goldschmidt, Model 1910, complete as described in <i>Zeitschrift für Krystallogr.</i> , 1898, Bd. 29, Seite 333.....	360.00	480.00
40408.	Goniometer, Two-Circle type, Goldschmidt, as above, simplified model.....	240.00	320.00
40412.	Accessory to the above for the photography of oriented specimens.....	21.00	28.00
40416.	Application Goniometer, Penfield, pocket form, from stock.....		1.25
40420.	Crystal Modeling Apparatus, Goldschmidt, as described in <i>Zeitschrift für Krystallogr.</i> 1908, Bd. 45, Seite 573.....	120.00	160.00
40424.	Mineral Sectioning Apparatus, Wulffing.....	11.40	15.20



No. 40432



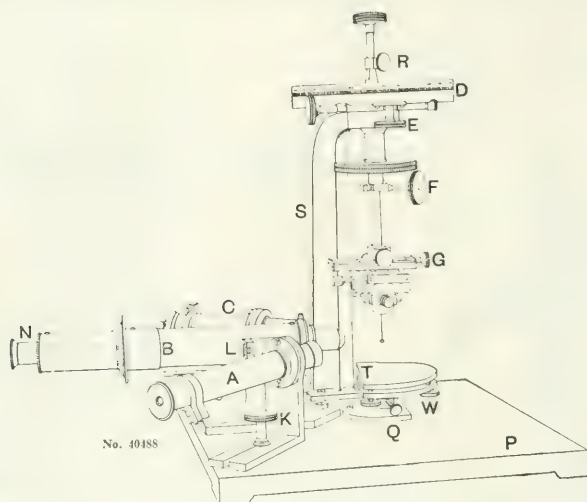
No. 40440



No. 40448

40428.	Goniometer, Goldschmidt, large model, for the measuring of very large crystals, complete as described in <i>Zeitschrift für Krystallogr.</i> 1910, Bd. 47, Seite 50.....	Duty Free 540.00	Duty Paid 720.00
40432.	Application Goniometer, Two-Circle type Goldschmidt, an improvement of the 1896 model, as described in <i>Zeitschrift für Krystallogr.</i> 1896, Bd. 25, Seite 321.....	11.40	15.20
40436.	Axial-Angle Apparatus, Wülfing, complete in accordance with <i>Neues Jahrbuch für Mineralogie</i> , 1899, Beil. Bd. 12, Seite 343.....	150.00	200.00
40440.	Tourmaline Tongs, with condensing lens. Price varies in accordance with the perfection of the tourmaline plates. A good specimen may be had for.....	7.50	10.00
40444.	Tourmaline Specimens, mounted in cork mounts, 48 x 28 mm, for demonstration of optical properties of crystals in polariscope, dichroscope, etc., and very suitable for use with tourmaline tongs, and illustrating all of the six crystal systems, are to be had at prices varying in accordance with the perfection of the specimens. On this account it is difficult to list these specimens but complete lists of the best European preparers will be sent on application.		
40448.	Grinding and Polishing Machine, Gasser, designed especially for the preparation of micro sections of bones and teeth. The table is rigidly constructed and is 1 meter in height, and is provided with a zinc dish in which the revolving lap operates, so that grinding may be done under water if necessary. The electric motor drives the lap at a speed of 1500 r.p.m. while above the table a heavy support carries the specimen spindle, provided with knob for hand guidance and adjustable ring for regulating the thickness of the specimen. The specimen discs are 5 cm in diameter. Bone sections may be ground and polished completely in ten minutes and teeth sections in 20 minutes. Outfit consists of apparatus with motor (Voltage must be specified in ordering), starting rheostat, connecting plug, two 15 cm grinding discs of different degrees of fineness, one 15 cm metal disc for polishing and four specimen discs.....	Duty Free 66.00	Duty Paid 80.00
40452.	Extra Grinding Discs, 15 cm, each.....	1.65	2.00
40456.	" Polishing Discs, 15 cm, each.....	3.00	3.60
40460.	" Specimen Discs, 5 cm, each.....	.70	.80
40464.	Grinding and Polishing Machine, for minerals and metals, identical in construction with above but with gear providing a speed of 2000 r.p.m. to the grinding disc and with disc 20 cm in diameter. With automatic gear for rotating the spindle carrying the specimen disc during the process. Removable lead weights provide means of regulating the pressure upon the specimen disc when automatic gear is used. An adjustment ring upon the spindle automatically ends the grinding when the desired thickness of specimen is reached. Outfit consists of motor (Voltage must be specified in ordering). With rheostat and connecting plug, two 20 cm grinding discs of silica-carborundum compound of different cutting capacities and 20 cm disc of metal for polishing and two specimen discs 5 cm diameter.....	Duty Free 92.40	Duty Paid 112.00
40468.	Grinding and Polishing Machine, as above, with two specimen spindles for simultaneously grinding two specimens and with four discs.....	118.80	144.00
40472.	Grinding and Polishing Machine, as above, with four specimen spindles for simultaneously grinding four specimens and with eight discs.....	151.80	184.00
40476.	Extra Grinding Discs, of Silica-Carborundum, 20 cm diameter, each....	6.60	8.00
40480.	" Polishing Discs, of metal, 20 cm diameter, each.....	4.00	4.80
40484.	" Specimen Discs, each.....	.70	.80





No. 40488

**GONIOMETER, HUTCHINSON UNIVERSAL.** for use as an ordinary goniometer for the measurement of angles, as an axial-angle apparatus, as a Kohlrusch total-reflectometer and for determining refractive indices by the prism method. It is intended primarily for the examination of small crystals and by its aid all the usual crystallographic and optical determinations can be readily carried out. In its design the attempt has been made to combine efficiency with simplicity and strength of construction, together with adaptability to a great variety of purposes.

A circle *D*, five inches in diameter, graduated to  $\frac{1}{2}$  degrees and reading by a vernier to minutes, is supported by a stout bracket *S*, at a height of ten inches above a flat base-plate *P*, eleven inches square. The circle is provided with a slow-motion attachment, and can be clamped by the screw *E*. A steel rod, which can be clamped at any convenient position by the screw *F*, passes through the centre of the circle and carries, at its lower end, the ordinary centring and adjusting arrangements shown at *G*. A loose collar, which can be clamped to the rod by the screw *R*, gives the means of raising the adjusting head and of again lowering it to its former position.

A telescope *A*, and a collimator *C*, are securely clamped to the base-plate in the manner shown at *K*, a number of holes being provided for this purpose at convenient positions. The object-glasses of the telescope and collimator are  $\frac{1}{2}$  inch in diameter and about 4 inches in focal length. Their tubes are carried by collars, provided with adjusting screws. An additional lens of 2 inches focus is also supplied. This can be slipped into position in front of the objective of the telescope, thereby converting the latter into a microscope of low power with which the crystal can be examined.

The telescope and collimator are placed at any convenient angle to one another (some angle between  $60^\circ$  and  $90^\circ$  will be found suitable), and the microscope *B* is arranged so that its optical axis bisects the angle between them. The microscope tube, which is eight inches long, is moved by an ordinary coarse adjustment actuated by a pair of milled heads, one of which is seen in the figure just below the telescope. At one end it carries the fitting of an objective changer of the Zeiss pattern which enables different objectives to be rapidly slipped into position and provides a means of adjusting them to the axis of the microscope. Objectives of  $\frac{1}{4}$  inch and of 2 inches focal length will be found the most generally useful, but others can be employed if desired. At the other end a nicol *V* slips on over the eyepiece; the latter and the nicol-holder are slotted to admit of the insertion of a quartz-wedge or mica-plate. A Bertrand lens *L* slides into the body of the microscope.

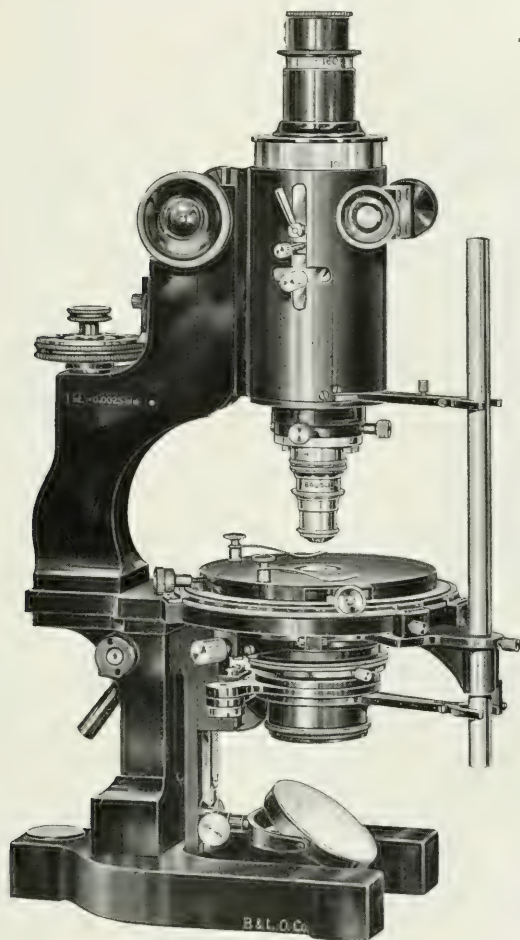
An adjustable table *T*, which can be levelled by the screws *W*, is carried by a steel rod which can be clamped by the screw *Q*; a loose collar clamped to the rod by a screw enables the table to be rotated when supported at any convenient height. On this table can be placed a tank, when it is desired to observe the crystal immersed in a liquid.

Two extra fittings, not shown in the figure, are also provided. One enables a short tube containing a nicol and a condensing lens to be placed opposite the objective of the microscope. The other can be clamped to the graduated circle: at its lower end it carries a collar into which the telescope *A* can be screwed, thus enabling the latter to be supported at the same height above the base-plate ( $\frac{3}{4}$  inches) as the collimator and microscope.

40488.	Universal Goniometer, as above, with 2 inch and $\frac{1}{2}$ inch microscope objectives and centering objective changes.....	Duty Free 210.00	Duty Paid 280.00
40492.	Special Objective, with centering changes and webbed eyepiece for using microscope as a telescope.....	15.00	20.00
40496.	Glass Tank, with optically plane face and Centigrade thermometer.....	5.60	7.50
40500.	Sliding tank holder.....	6.00	8.00
40504.	Case, for complete outfit.....	12.00	16.00



40512.	Dichroscope, von Lang, improved form, in case.....	Duty Free 4.20	Duty Paid 5.60
40516.	Dichroscope, with revolving stage and graduated circle, with spectroscopic attachment.....	12.00	16.00



No. 40520

**MICROSCOPE, BAUSCH & LOMB PETROGRAPHICAL RESEARCH MODEL LD.** This microscope, except for certain mechanical details, is patterned after the microscope described by *F. E. Wright in Amer. Jour. of Science*, (4) 29, 407-414, 1910; also in "The Methods of Petrographic Microscope Research," Carnegie Institution of Washington Publication 158, 1911.

The special features of this research model are:—

**Large Abbe Aplanatic Condenser**, N. A. 1.40, which, together with an Ahrens prism of 20 mm aperture, can be used both with high power and low power objectives.

**Special Mounting for Polarizer**, which can be swung in and out of axis of microscope at will.

**Large Sensitive Tint Plate mounted in rotating carrier below condenser.** This arrangement is superior in two respects to the usual method of inserting the plate above the objective: the optical system is not disturbed on insertion of the plate; the mounting enables the observer to rotate the sensitive tint plate and thus to vary at will the intensity of field illumination produced by the plate, also to pass from one quadrant to another. In very weakly birefracting minerals it is essential that the field illumination from the sensitive tint plate be very weak; otherwise the faint interference colors from the fine mineral grains, either in parallel or in convergent polarized light, will be veiled and lost to view in the intense illumination of the field produced by the sensitive tint plate in the usual diagonal direction.

**Large Mechanical Stage**, simple in design and construction and practically dust-proof, with a play of 24 mm in two directions at right angles, the divisions on the screw heads reading to 0.01 mm.

## MICROSCOPE, PETROGRAPHICAL (continued)

**Large space between stage and arm,** necessary for manipulation of universal stage and other accessories; also for opaque mineral investigations in reflected light.

**Objective Clamp and rings of case-hardened steel.**

**Device for simultaneous rotation of Nicols.**

**Wide Draw Tube** useful for photomicrographic work.

**Entire analyzer carrier included within body tube** and thus protected from dust. Even when the analyzer is withdrawn from axis of microscope, it is still within the tube.

**Bertrand lens slide accurately constructed** to insure exact centering. Below the Bertrand lens is an iris diaphragm and above it a small lens on an arm, which, together with eyepiece, forms a microscope focused on the plane of the iris diaphragm and enables the observer to bring the image of the object on the stage to coincidence with the plane of the iris diaphragm and thus to insure elimination of stray light from adjacent mineral grains in the case of the measurement of the optic axial angle of a mineral grain or plate in a specimen.

**Rack and Pinion movement for Bertrand lens,** permitting one to raise or lower it and thus change the magnification of an interference figure from one to two diameters.

## Specifications of Stand

**Arm**—Curved type, providing ample vertical distance from stage to arm of 60 mm; horizontal distance from center of stage to base of arm, 80 mm.

**Tube**—Body tube, 55 mm outside diameter, with inner tube adjustable by rack and pinion (two heads) through a range of 25 mm; inner tube contains a Bertrand lens, with an auxiliary lens above it and an iris diaphragm below it, each adjustable from the right hand side of the body tube; draw tube slides in metal fitting graduated in single millimeters and numbered 160, 170 and 180, taking standard sized (23 mm) eyepieces, which are supplied here with cross-hairs and the eye-lens adjustable for focusing upon them; notch in the upper edge of draw tube fixes azimuth of the eyepiece; within the lower portion of the body tube the analyzer is mounted to slide in and out of the optical axis on the rotating arm; 45° slot in body tube with dust-proof shutter placed just beneath the analyzer for accessories; provided with non-detachable nose-piece, centering by means of two screws working at right angles in N and E positions.

**Focusing Adjustments**—Coarse adjustment by standard rack and pinion; fine adjustment of Bausch-Lomb lever type with micrometer screw head graduated in 100 parts, each equal to .0023 mm in vertical movement, and provided with a vernier screw head for fine adjustment to follow rise and fall of micrometer head for reading to .0005 mm; mechanism ceases to act when objective touches slide.

**Stage**—Revolving, with clamping device to set in any desired position; circumference graduated in single degrees with each tenth line numbered, the two verniers reading to 0.1°; two additional verniers, also reading to 0.1°, are attached to the support of bar connecting nicols; outside diameter of graduated circle, 112 mm; mounted on the revolving stage is an adjustable stage plate, 95 mm in diameter, with mechanical cross movements actuated by graduated heads set 90° apart, the graduations reading to 0.01 mm; stage aperture, 32 mm, with reducing disc having an aperture of 19 mm.

**Substage**—Adjustable by rack and pinion; carries condenser, iris diaphragm, selenite plate and polarizer.

**Illuminating Apparatus**—Aplanatic condenser, 1.40 N.A., with upper two lenses removable, giving 0.40 N.A. with lower lens alone; placed in fixed substage arm with small set-screw and is easily removable; iris diaphragm below condenser; mirror, plane and concave, 50 mm in diameter, with fork in socket adjustable along substage support.

**Polarizer**—An Ahrens prism in revolving mount attached to swinging arm, permitting complete removal from optical axis; above the polarizer, attached to the iris diaphragm mount, is a revolvable carrier for sensitive tint plate (30 mm outside diameter), itself carried in sliding mount allowing withdrawal from, and return to, optical axis.

**Analyzer**—A Thompson prism, revolvable a quarter turn, insliding prism-box, allowing withdrawal from, and return to, optical axis entirely within the body tube.

**Simultaneous Rotation of Nicols**—Rigid bar supported at plane of stage by arms moving through 90°, with two verniers to provide for reading angle of rotation; connection arms, with broad bearing surfaces, extending from analyzer and polarizer carriers engage bar in such a way as to permit free movement of body tube and substage when focusing and to eliminate lost motion; bar is movable in its support for instant release of arms, allowing independent rotation of polarizer or analyzer; a clamping device with milled head on one of the verniers sets the bar support against rotation, to permit the principal nicol planes to be set parallel with cross-hairs of eyepiece and to provide for rotating specimen on stage rather than rotating connected nicols.

**Changing Nosepiece**—Consists of two parts—the upper one with clamp permanently attached to centering nosepiece, the lower, a ring threaded to take objective; ring and socket in which it fits made of steel for long term service; with ring for each objective quick interchange is provided for.

**Accessories Included**—Bertrand lens, mounted; one selenite plate, mounted, to fit substage; one slide-plate to carry blue glass and ground glass for insertion below condenser iris diaphragm when sensitive tint plate is withdrawn from optical axis.

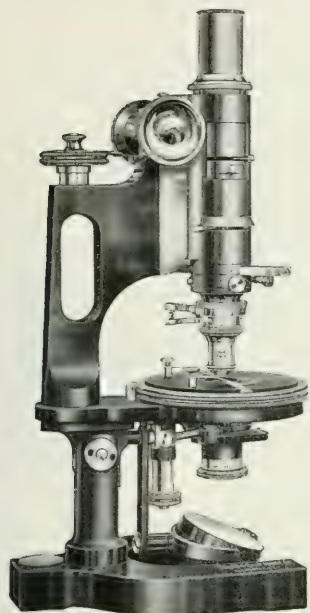
**Finish**—Principal parts in alcohol-proof black; smaller adjusting heads and bar nickel-plated; graduated circles in German silver.

**Case**—Of hard wood with polished finish, fitted with brass lock and key.

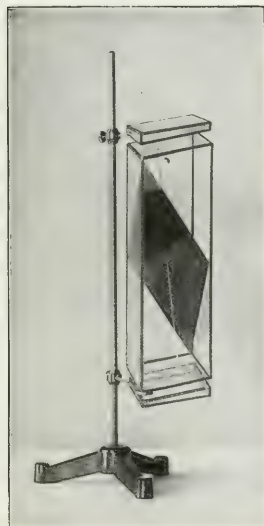
	Outfit	Objectives	Cross-Hair Eyepieces	Quick Changing Nosepiece	Price
40520.	LD	16 mm, 4 mm	7.5X, 10X,	With two rings	\$311.75
40524.	LD	32 mm, 16 mm, 4mm	7.5X, 10X, 12.5X	With three rings	320.00

For the measurement of the optical constants of mineral grains and plates, the following accessories are essential:

40528.	<b>Universal Holder and Positive Eyepiece</b> to be used with the following accessories.....	15.50
40532.	(a) <b>Graduated Quartz Compensator</b> for the measurement of birefringence.....	17.25
40536.	(b) <b>Bi-Quartz-Wedge Plate</b> for the measurement of extinction angles.....	19.50
40540.	(c) <b>Co-ordinate Grating</b> , 0.1 mm divisions, for the measurement of optic axial angles and for statistical mineral volume analysis after the Rosival method or the percentage area method.....	10.00
40544.	(d) <b>Cap Analyzer</b> with 2° graduations for use above positive eyepiece, fitting into recessed plate with means for a sufficient rotary adjustment to permit accurate setting of the index point with zero of the analyzer.....	8.00
40548.	<b>Sliding Stop Eyepiece</b> for the observation of interference figures from fine mineral grains; substituted for regular eyepiece; consists essentially of two adjustable slits at right angles with special eyepiece for focusing on the same.....	12.50
40552.	<b>Adjustable Support</b> for opaque objects; replaces condenser in substage; two adjustable screws set at right angles tilt the table in any direction desired; the object table revolves.....	10.00
40556.	<b>New Model Vertical Illuminator</b> .....	12.00
40560.	<b>Petrographical Objective</b> , 0.95 N. A., 4.5 mm E. F.....	8.00



No. 40564



No. 40572

**MICROSCOPE, BAUSCH AND LOMB PETROGRAPHICAL TYPE LCH.** The features of this new model are the unusually large space provided for manipulation of objects and super-stage accessories; the mounting of rotatable analyzer; the arrangement of the substage parts for quick change from polarized to ordinary and from parallel to convergent light. It is a high-grade instrument combining the efficiency and simplicity of adjustment which are commensurate with the requirements of laboratory work. In designing this instrument the Bausch & Lomb Optical Co., have had the kind assistance of Dr. Wright, of the Carnegie Institution of Washington, D. C.

**Tube**—Body tube, 35 mm outside diameter; draw-tube, sliding in metal fitting, graduated in single millimeters and numbered 160, 170 and 180; having slot for Bertrand lens, with an iris diaphragm above it; taking standard size (23 mm diameter) eyepieces, which are supplied here with cross-hairs and the eye-lens adjustable for focusing upon them; having two notches in upper edge for fixing the azimuth of the eyepiece; analyzer box slides in and out of body tube; slot in body tube with dust proof shutter placed just beneath analyzer for accessories; nosepiece with society screw thread, non-detachable, centering by means of two screws working at right angles in N and E positions.

**Focusing Devices**—Coarse adjustment by standard rack and pinion; fine adjustment of Bausch & Lomb lever type with micrometer screw head graduated in 100 parts, each equal to .0025 mm in vertical movement, and provided with a hinged vernier for reading to .0005 mm, mechanism ceases to act when objective touches slide.

**Stage**—Revolvable; circumference graduated in single degrees with each tenth line numbered, the double vernier reading to one-tenth degree in both directions; diameter of stage outside of graduations 102 mm, inside 90 mm; stage plate, vulcanite-covered, having inlaid for orientation two millimeter scales at right angles, 30 mm long, with each tenth line numbered.

**Substage**—Adjustable by long-range quick-acting screw, turning to the left completely clear of the optical axis when screw reaches limit of downward movement; carrying condenser, iris diaphragm and polarizer.

**Illuminating Apparatus**—Three-lens condenser, 1.10 N.A.; upper lenses in swinging arm operated by knurled head at the side, providing for quick change from convergent to parallel light without disturbing any of the other substage parts; iris diaphragm below condenser; mirror plane and concave, 50 mm diameter, on swinging arm with spring clip for central position.

**Polarizer**—A Nicol prism (angular field 19°) in revolving mount graduated in 13 degree parts, each alternate line numbered—0, 30, 60, 90 and so on up to 330; entire mounting with prism removable from optical axis by a double-swing movement to one side.

**Analyzer**—A Thompson prism, revolvable a quarter turn, in sliding-prism-box which carries graduations and indicator allowing withdrawal and return to optical axis without disturbing the reading on scale. Graduations in 5 degree parts, numbered 0, 30, 60 and 90.

**Changing Nosepiece**—As shown in illustration, consists of two parts, the upper one with clamp screwing into centering nosepiece—the lower, a ring threaded to take objective. The ring and the socket in which it fits are made of steel for long service. With a ring for each objective, quick interchange is provided for.

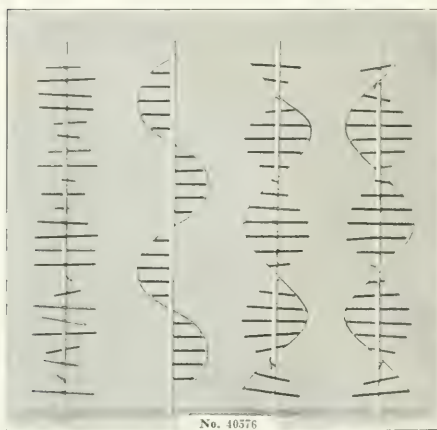
**Accessories Included**—One selenite plate, mounted, one quartz wedge, mounted, one Quarter Undulation plate, mounted, and Bertrand lens, mounted; pinhole cap fitting draw-tube for observation of interference figures after Lasaulx method.

**Finish**—Main parts including body-tube in alcohol-proof black, pinion heads and adjacent parts in natural brass color, adjusting heads nickel plated; all graduations in German silver.

**Case**—Of hardwood with polished finish; fitted with brass lock and key.

	Outfit	Objectives	Cross Hair Eyepieces	Quick Changing Nosepieces	Price
40564.	LCH2	16 mm 4 mm	7.5 × 10 ×	With Two Rings	153.65
40568.	LCH4	32 mm 16 mm 4 mm	7.5 × 10 × 12.5 ×	With Three Rings	160.00
40572.	Glass Model of Nicol Prism, Vrba, on adjustable support, 30 cm in height, for lecture table use, duty free.				7.35



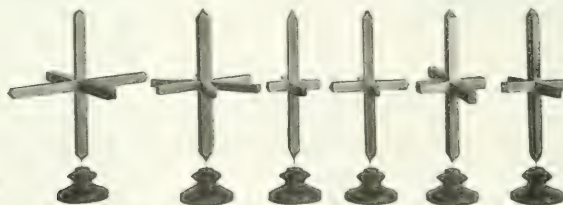


No. 40576



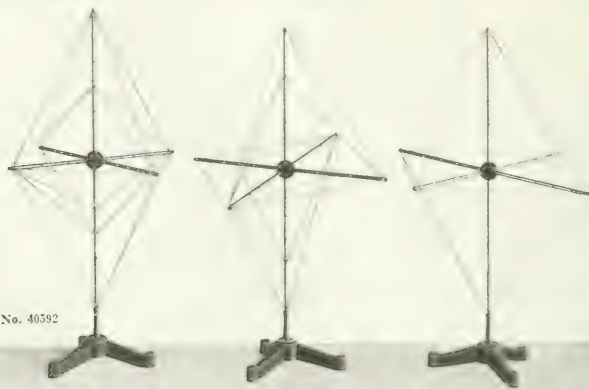
No. 40580

40576. **Polarization Model, Vrba**, consisting of four metallic rods with crosspieces of various lengths set at right angles thereto and representing:  
 1. The ether vibrations in an ordinary beam of light, i.e. vibrations in various planes.  
 2. " " " " a plain polarized beam of light, i.e. vibrations all in one plane.  
 3. " " " " circular polarized beam of light, i.e. vibrations in a spiral plane, laevo-rotary.  
 4. " " " " circular polarized beam of light, i.e. vibrations in a spiral plane, dextro-rotary.  
 Set of 4 models ..... 6.50  
 40580. **Glass Rhombohedron, Busz**, for demonstration of double refraction in calcspar, on adjustable support with base, duty free ..... 6.75



No. 40584

40584. **Models of Crystal Axes**, a set of six wooden axes showing the axial arrangement of each of the six crystal systems, 15 cm size. When ordered with models, duty free ..... 4.50  
 40588. **Models of Crystal Axes**, as above, 25 cm size, duty free ..... 6.30



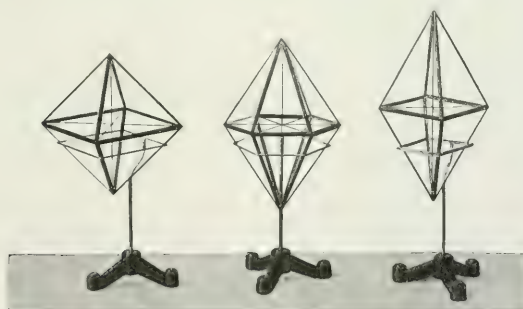
No. 40592

40592. **Models of Crystal Axes**, consisting of a set of six metal supports with colored silk threads to indicate positions of surfaces. The models are 38 cm in size, with supports and are very well suited for lecture table demonstrations, duty free ..... 24.00  
 40596. **Models of Crystal Axes**, as above, 50 cm size, duty free ..... 30.00



No. 40600

40600. **Crystal Models, Pear Wood**, consisting of a set of 30 models demonstrating the simpler fundamental forms of the six crystal systems as follows:—
- |                                 |                                     |
|---------------------------------|-------------------------------------|
| I. Regular, Nos. 1 to 13.       | IV. Rhombic, Nos. 21 to 27.         |
| II. Hexagonal, Nos. 14 to 19.   | V. Monosymmetrical, Nos. 28 and 29. |
| III. Tetragonal, Nos. 20 to 23. | VI. Asymmetrical, No. 30.           |
- Models, as above, with 5 cm models, in polished compartment case, **from stock** ..... 10.00  
 " " " 10 cm " " " " " **duty free** ..... 18.75
40604. **Crystal Models, Pear Wood**, consisting of a set of 20 models supplementing the preceding set of 30 and which add some of the more ordinary combinations and twin developments.  
 Models, as above, 5 cm size, in polished compartment case, **from stock** ..... 12.00  
 " " " 10 cm " " " " " **duty free** ..... 17.40
40608. **Crystal Models, Pear Wood**, lecture table set of 30 models, each of 20 to 25 cm size, with blackened surfaces for marking with crayons. The arrangement of the models is exactly the same as in set No. 40600. Imported to order only, **duty free** ..... 24.60
40612. **Crystal Models, Pear Wood, Hintze**, consisting of a set of 80 models including the holohedral, hemihedral and tetartohedral forms, to which are added the designations of the new arrangement by Groth, *Physikal. Krystallographie*, 4. Aufl. and Liebisch, *Grundriss der physikal. Krystallographie* 1896.  
 Models, as above, 5 cm size, in polished compartment case, **duty free** ..... 21.60  
 " " " 10 " " " " " **duty free** ..... 60.00



No. 40616

40616. **Crystal Models, Glass**, with colored silk axes, consisting of a set of six models representing the six crystal systems with a typical form of large size, i.e., 20 to 25 cm, from each system; specially adapted for lecture table use. In case without supports, **from stock** ..... 9.00



No. 40620

40620. Crystal Models, Glass, consisting of a set of 15 models of the same size and execution as the above but representing the more important fundamental forms of the six systems. In polished wood case; duty free..... 14.40

Crystal Models, Glass, consisting of a set of 98 of the same size as above, i.e., 20 to 25 cm, and same execution as the preceding sets, composed of six separate collections which may, if desired be ordered separately as follows:

40621. Crystal Models, Set B, 14 models showing the simpler pyramidal and prismatic forms of the six crystal systems and their relative position to each other. In polished wood case. Duty free.... 13.20
40628. Crystal Models, Set D, 30 models showing the simpler fundamental forms, with colored axes in polished wood case. Duty free..... 34.20
40632. Crystal Models, Set E, 10 models showing the simpler hemihedral forms, the holohedral form being made of cardboard and enclosed in the former. In polished wooden case. Duty free.... 16.80
40636. Crystal Models, Set F, 18 models showing the simpler combinations; in polished wooden case. Duty free..... 30.00
40640. Crystal Models, Set G, 16 models showing the complex crystals of holohedral and hemihedral forms. The combination is made of cardboard and is shown inside the glass model which corresponds to the faces of the simpler form of the combination. In polished wooden case. Duty free. 26.70
40644. Crystal Models, Set H, 10 models of twin crystals arranged so that each part may be rotated about the twinning axis. In polished wooden case. Duty free..... 20.40
40648. Complete Set of 98 Models, consisting of six collections as above, without boxes and if ordered at one time, duty free..... 108.00
40652. Crystal Models, Cardboard, Vrba. These models are of the large lecture table size, i.e., 16 to 25 cm. and are stoutly made of sized cardboard with yellow faces and black binding. Complete arrangement of 60 models, duty free..... 40.50
40656. Crystal Models, Cardboard, Vrba, as above, but a smaller set consisting of 30 representative models. duty free..... 21.00
- Note—For large collections of 520 models arranged by Vrba, send for Krantz special catalogue No. 11.
40660. Supports for Crystal Models, Vrba, a three-arm support for simultaneously displaying three large glass or cardboard models. When ordered with models, duty free..... 3.60
40664. Supports for Crystal Models, Krantz, a new set of ten holders on individual bases, suitable for demonstrating all ordinary forms; duty free..... 13.50
40668. Supports for Crystal Models, a simplified set to support the six principal forms, on adjustable support with base, duty free..... 9.00



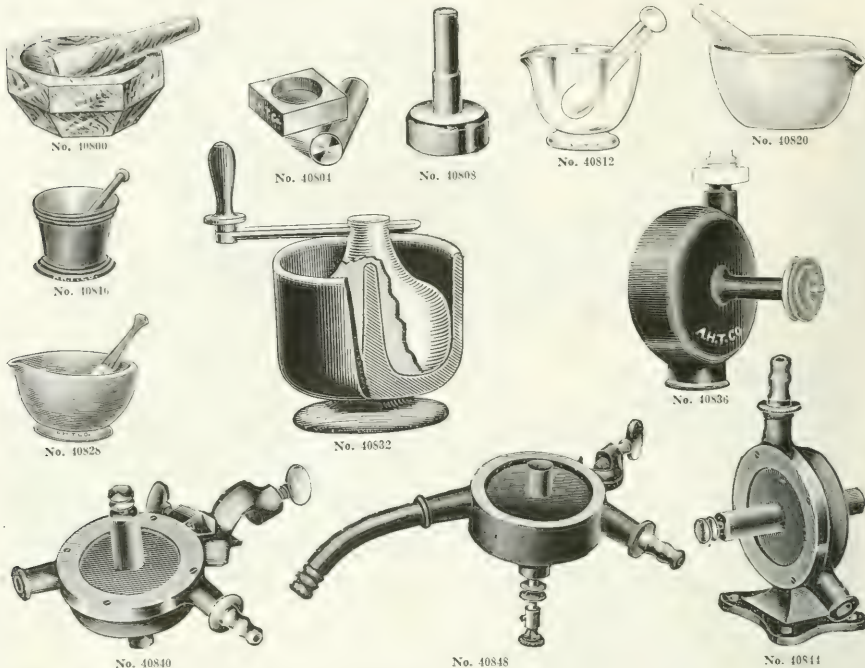
No. 40652



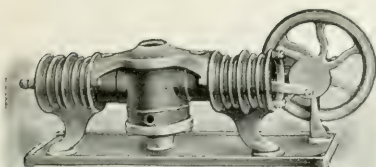
No. 40660



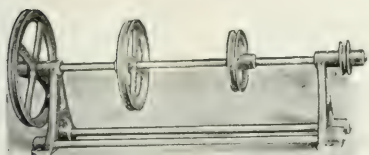




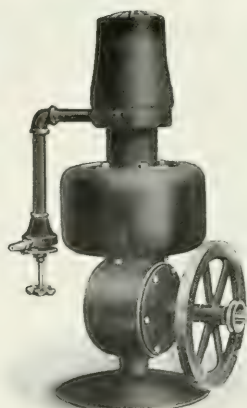
40800.	Mortars, Agate, carefully selected. With pestle. Dimensions given are outside.								
	Diameter, mm. ....	35	40	50	65	75	90	100	120
	Each .....	1.50	1.75	2.00	3.50	4.50	7.00	8.50	15.00
40804.	Mortar, Diamond, Leeds, of hardest steel. ....								2.00
40808.	" " Plattner, of hardest steel. Outside diameter, mm. ....							15	25
	Each .....							4.00	6.00
40812.	Mortars, Glass, with pestle. Capacity, ounces. ....				2	4	8	16	32
	Diameter, inches. ....				2 1/4	4	4 1/2	5 1/2	6
	Each .....				.20	.30	.40	.60	.90
40816.	Mortars, Iron, with pestle. Actual capacity, cc. ....				250	350	750	1300	2200
	Outside diameter, inches. ....				4 1/2	4 1/2	5 1/2	6 1/2	8
	Each .....				.50	.60	.75	1.25	2.00
40820.	Mortars, Porcelain, with spout and pestle, glazed outside, rough inside.								
	Outside diameter, mm. ....	65	80	110	130	150	175	200	260
	Each .....	.15	.20	.40	.50	.70	.90	1.10	2.40
40824.	Mortars, Porcelain, with spout and pestle, glazed inside and outside.								
	Outside diameter, mm. ....	65	80	110	130	150	175	200	
	Each .....	.30	.35	.55	.65	.80	1.20	1.35	
40828.	Mortars, Hard, Acid-proof Stoneware, so-called "Wedgewood," with pestles with wooden handle.								
	Diameter, inches. ....	3 1/2	3 1/2	4	4 1/2	5	5 1/2	6 1/2	7 1/2
	Each .....	.35	.40	.45	.50	.60	.70	.85	1.00
	Diameter, inches. ....	8	9	10	10 1/2	11 1/2	12 1/2	13	14
	Each .....	1.25	1.50	1.85	2.40	3.00	3.50	4.10	4.75
40832.	Mortar, Iron, Buck, for grinding and amalgamating. By rotation of the miller a large sample of quartz may be ground in contact with quicksilver. Diameter, inches. ....							6	8
	Each .....							6.00	9.00
40836.	Motor, Water, for direct attachment to faucet; with 80 lbs. pressure will furnish 1/2 H.P. With pulley. ....								5.00
10840.	Motor, Water, Rabe, improved construction with 75 mm diameter turbine, and clamp to hold same on an ordinary apparatus stand in either a vertical or horizontal position. ....								5.00
40844.	Motor, Water, Rabe, same as No. 40840 but to screw on table. ....								6.00
40848.	" " " with clamp for vertical apparatus stand so that turbine revolves in a horizontal position. Convenient for stirring devices and with clamp to shaft to attach rods and other forms of stirrers and with long delivery tube to carry waste water away from apparatus. ....								8.00



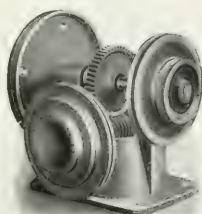
No. 40852



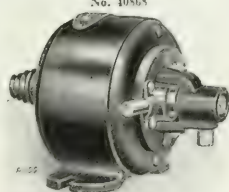
No. 40861



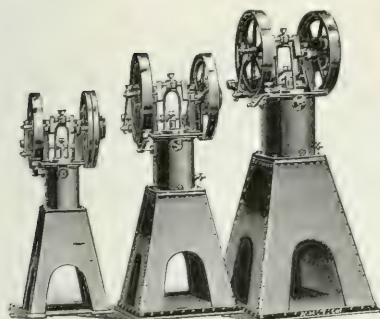
No. 40856



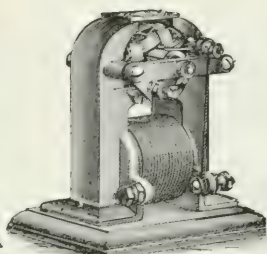
No. 40868



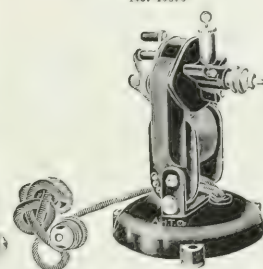
No. 40876



No. 40872



No. 40880



No. 40884

40852.	Motor, Hot Air, may be used with either gas or alcohol; diameter of fly-wheel 6 inches, belt pulley 1 $\frac{1}{2}$ inches; speed about 300 r. p. m.; consumes 3 cu. ft. of gas per hour.....	15.00
40856.	Motor, Hot Air, $\frac{1}{8}$ H. P., similar to No. 40852 but larger; speed 300 r. p. m. With gas burner.....	35.00
40860.	" " same as No. 40860 but for gasoline burner.....	40.00
40861.	Countershaft, for use in power transmission with small laboratory motors; shaft 12 inches long, 1 $\frac{1}{2}$ inches in diameter with pulleys 1, 2, 3 and 4 inches in diameter.....	1.50
40868.	Speed Reducing Gear, for small laboratory motors. Useful for converting the high speed of a motor into a slow, powerful motion. The round plate may be removed and apparatus directly connected to shaft of motor. The fast running pulley is provided with three grooves and the slow with two, thus effecting a wide range of speeds.....	5.00
40872.	Motor, Hot Air, Heinrici, noiseless, and absolutely safe; for operating with gas burner. Motors of $\frac{1}{16}$ H. P. can be furnished on special order for alcohol burner without increase in price. Motors of the four larger sizes are furnished on special order with either alcohol burner or patent petroleum burner at slightly extra prices.	
	Horse Power, approx.....	$\frac{1}{200}$ $\frac{1}{200}$ $\frac{1}{180}$ $\frac{1}{160}$ $\frac{1}{140}$
	Revolutions per minute.....	
	Duty Free.....	22.50 28.80 39.00 60.00 87.00
	Duty Paid.....	30.00 38.40 52.00 84.00 116.00
40876.	Motors, Electric, small ventilating type for operation on either direct or alternating current and either 110 or 220 volts circuit, with triple pulleys, $\frac{3}{8}$ , $\frac{1}{2}$ and $\frac{3}{4}$ inch in diameter. Current and voltage must be specified in ordering.	
	Horse Power.....	$\frac{1}{1000}$ $\frac{1}{1500}$ $\frac{1}{2000}$ $\frac{1}{3000}$
	Revolutions per minute.....	
	Each, for 110 volts.....	12.50 12.50 12.50 12.50
	Each, for 220 volts.....	13.50 13.50 13.50 13.50
40880.	Motor, Electric, for operating on battery circuit, for any voltage up to 8 volts; size 3 $\frac{1}{2}$ x 4 $\frac{1}{2}$ x 4 $\frac{1}{2}$ inches high; weight 3 $\frac{1}{2}$ lbs.; pulley $\frac{3}{8}$ inch diameter.....	4.50
40884.	Motor, Electric, with variable speeds, i. e., from 100 to 1800 r. p. m.; without motor. Adjustable to any angle. For use on either 110 or 220 volt circuits. In ordering please specify voltage and whether current is direct or alternating.....	7.00



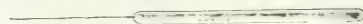
No. 40888



No. 40892



No. 40896



No. 40908



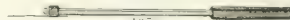
No. 40916



No. 40924



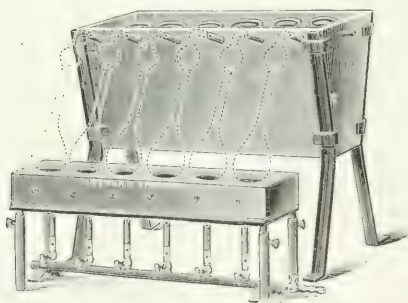
No. 40920



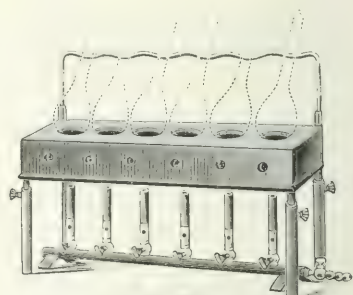
No. 40928

40888.	Mould, Pouring, of cast iron, with three conical cavities 2 inches in diameter, with wooden handle.	1.00
40892.	Mould Pouring, of cast iron, with hemispherical cavities 1½ inches in diameter, with 6 cavities.	1.00
40896.	Muffles, Battersea, regular form. Dimensions given are outside	
	Number.....	B C D E F
	Length, inches.....	7½ 8 8½ 9 10
	Width, inches.....	4½ 4½ 5 5½ 6
	Height, inches.....	2½ 3 3½ 3½ 4
	Each.....	.45 .55 .65 .70 .80
40900.	Muffles, Opaque Fused Silica.	
	Length, inches.....	4½ 7½ 6½ 9½ 9½ 15 15
	Width, inches.....	2½ 3 4½ 5½ 6½ 9½ 11
	Height, inches.....	2½ 3 3½ 5 4½ 6½ 7
	Each.....	1.85 2.50 2.50 4.25 3.75 7.00 10.00
40904.	Muffles, Alumund, D shaped.	
	Length, inches.....	4½ 4½ 6½ 7 9½ 12 12½ 13
	Width, inches.....	3½ 3½ 5 4½ 5½ 6½ 7½ 6½
	Height, inches.....	2 2½ 3½ 3½ 4½ 4½ 4½ 4½
	Each.....	1.75 2.25 3.50 3.25 4.50 6.00 6.50 7.00
40908.	Needle, Inoculating, a glass rod with 1½ inches of No. 26 platinum wire fused in end.	.50
40912.	Needle, Inoculating, same as above but with 3½ inches of No. 24 platinum wire	1.00
40916.	" " Kolle, consisting of a holder entirely of aluminum with a non-conducting inset to prevent extreme end from heating, without platinum loop	.80
40920.	Needle, Inoculating, Kolle, new form, with demountable hard rubber handle, without platinum loop	1.20
40924.	Needles, Inoculating, Ravenel, consisting of No. 24 platinum wire securely mounted in an aluminum rod with protecting cover made of a glass tube with one end closed. Furnished either with a straight needle or twisted loop. Style.....	Straight Twisted
	Each.....	.80 1.50
40928.	Needle, Inoculating, Rosenberger, consisting of a rosewood handle with clamp for conveniently inserting platinum wire.	.50
40932.	Needle, Inoculating, same as above, but with 1½ inches of No. 26 platinum wire.	.75
40936.	"Platinid" Wire, as recommended by Neisser for use in inoculating needles because of the present high price of platinum. Per foot.....	.10

# APPARATUS FOR THE DETERMINATION OF NITROGEN



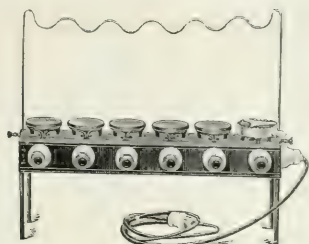
No. 40960



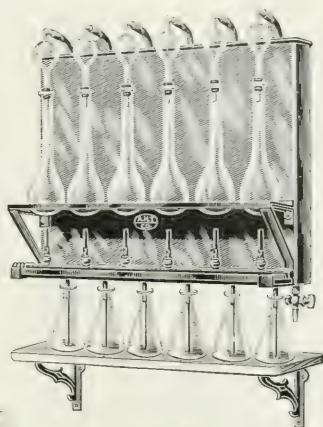
No. 40968

40960.	Kjeldahl Distilling Apparatus, complete, consisting of No. 40964 Condenser with block tin tubes and Burner Shelf No. 40968. With burners but without glass flasks or connecting tubes.	
	Number of burners.....	6 10
	Each.....	42.00 60.00
40964.	Kjeldahl Condenser, only, of copper, with coils of block tin, as shown in Kjeldahl outfit No. 40960.	
	Number of coils.....	6 10
	Each.....	28.00 42.50
40968.	Kjeldahl Digesting Shelf with burners, with iron support for the necks of the flasks when used for digestions. This is identical with the distilling shelf used in outfit No. 40960.	
	Number of burners.....	6 10
	Each.....	17.50 24.00

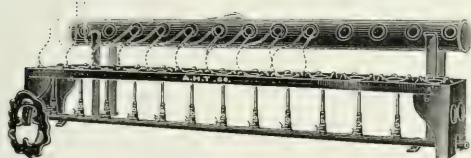




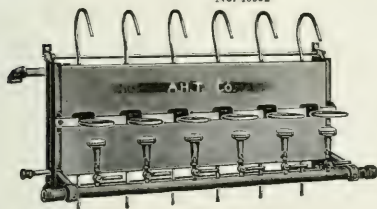
No. 40972



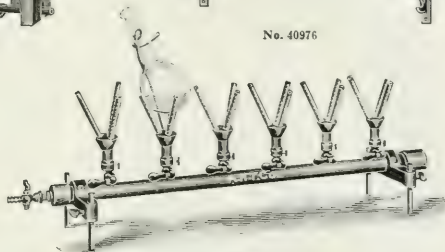
No. 40976



No. 40982



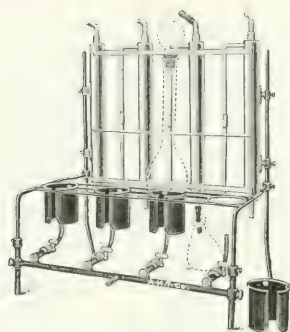
No. 40984



No. 40988

40972.	Kjeldahl Digesting Shelf, Electric, same as No. 40963 but with individual electric heaters. Voltage must be stated in ordering. Number of heaters.....	6	10
	Each.....	40.00	64.00
40976.	Kjeldahl Distilling Apparatus, improved form, made to hang on the wall. A very convenient apparatus for food chemists in the determination of ammonia and nitrogen. The burners, flasks and receivers are handled from the front and without interference. The burners are adjustable and may be used with natural, illuminating or gasoline gas. Condenser of heavy copper with block tin tubes. With six burners, but without glassware.....	60.00	
40980.	Kjeldahl Distilling Apparatus, same as above but with support to stand on table. With six burners.	63.00	
40984.	Kjeldahl Distilling Apparatus, Folin Modification, of heavy tinned copper, with quickly removable, adjustable and interchangeable ring supports of both 4 and 5 inch diameter. The copper still proper is bolted between cast iron end brackets by which the entire apparatus is fastened to the wall. Number of burners.....	6	12
	Each.....	35.00	60.00
	Extra Rings 5 inch, Each.....		.30
	" 4 " Each.....		.25
40988.	Kjeldahl Digesting Rack, Folin Modification, which obviates the use of a shelf as the burners and bulb rack are a self-contained unit. Supports for the necks of the flasks are not regularly included because it is better to allow the necks to rest directly in the lead pipe connected with ventilating tube. Individual supports are furnished extra if desired. Number of burners.....	6	12
	Each.....	15.00	25.00
40989.	Individual Rack Supports for necks of flasks, each.....		.20
40992.	Kjeldahl Digesting Shelf, Johnson, as used in the Connecticut Agricultural Experiment Station. Of heavy cast iron. The flask heaters are 4 1/2 inches apart from center to center and the flasks are supported by placing their necks within the openings in the large lead pipe which should be connected with the ventilating system. Each burner is furnished with stopcock and the price includes the lead pipe, 4 inches in diameter, on separate stand. Number of burners.....	6	10
	Each.....	34.00	44.00
40996.	Kjeldahl Digesting Shelf only as listed in above outfit; without lead pipe or glassware. Number of burners.....	6	10
	Each.....	24.00	30.00
			33.50





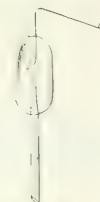
No. 41000



No. 41012



No. 41016



No. 41020



No. 41024



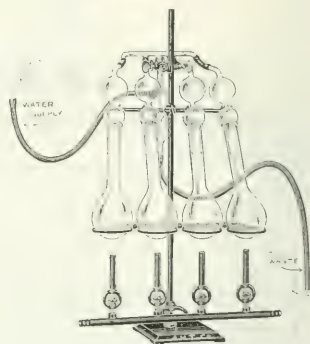
No. 41028



No. 41032



No. 41036



No. 41004

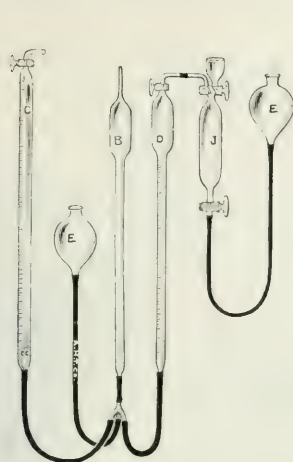


No. 41040



No. 41008

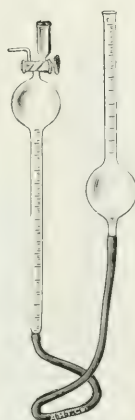
41000.	Kjeldahl Distilling Apparatus, new form, with individual condensers, light and portable and offers the advantage of complete adjustment in all directions so that different size flasks and connecting bulbs may be used. Each burner is furnished with a removable protecting shield and condenser jackets are of brass with condensing tubes of heavy block tin. With out glassware.		
	Each .....	30.00	40.00
41004.	Digestion Apparatus, Fumeless, Sy. See <i>Journal of Industrial and Engineering Chemistry, September, 1912</i> . With this apparatus digestions can be made without the use of a fume closet in any place having a water supply and drain. All fumes are disposed of by means of a filter pump and the price includes filter pump, connecting bulb tubes, stand, burners and four 500 cc Jena Kjeldahl flasks.		15.00
41008.	Kjeldahl Distilling Apparatus for Single Determinations. Convenient where but little work is to be done. Complete as illustrated, including glassware.		5.00
41012.	Kjeldahl Connecting Bulbs, spherical form, with one curved tip at top.		
	Diameter of bulb, mm. ....	52	65
	Each .....	.50	.60
41016.	Kjeldahl Connecting Bulb, Jennings, as used in water analysis. With tubulature in bulb.		.75
41020.	Kjeldahl Connecting Bulbs, cylindrical form, with two curved tips inside of the bulb.		
	Diameter of bulb, mm. ....	45	55
	Length of bulb, mm. ....	100	120
	Each .....	.65	.75
41024.	Kjeldahl Connecting Bulbs, Hopkins, with single straight tubulation inside of bulb.		
	Diameter of bulb, mm. ....	50	65
	Each .....	.50	.60
41028.	Nitrogen Bulb, Fresenius .....		.50
41032.	" " Vollhardt .....		.50
41036.	" " latest form .....		.60
41040.	" " Will-Varentrapp, with three bulbs .....		.35
41044.	" " " " four " .....		.45



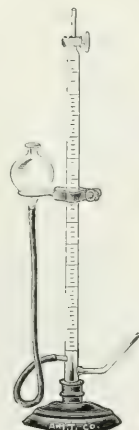
No. 41048



No. 41080



No. 41084



No. 41092

41048. Nitrometer, Dupont, latest modification. For original description see *Journal of the Society of Chemical Industry*, 1900, p. 182. As used by the manufacturers of explosives. Glass parts only, without support..... 18.75

41052. B. Compensating Tube, only.....	1.75
41056. C. Large Measuring Tube, only.....	4.00
41060. D. Nitrogen Bulb Tube, only.....	5.00
41064. E. Levelling Reservoir, only.....	.75
41068. J. Reaction Bulb, only.....	6.00
41072. K. Three-way Tube, only.....	.50

41076. L. Large Iron Support with six uprights fitted with rings. Rack and pinion movement for leveling bulb, etc. Made to order only.....	50.00
Note—For suitable tubing for use with above see our No. 46225.	

41080. Nitrometer, Lunge, with rubber tubing, but without support. Capacity, 50 cc in  $\frac{1}{10}$ ths. 100 cc in  $\frac{1}{10}$ ths. Each..... 4.00 4.50

41084. Nitrometer, Lunge, as used in the determination of nitrogen in gun powder, nitro-glycerine, dynamite etc. Graduated from 100 to 140 cc in  $\frac{1}{10}$ ths. With rubber connection but without support. 6.00

41088. Nitrometer, Lunge, same as No. 41084 but complete with support and clamps..... 10.00

41092. Schiff, graduated to 100 cc in  $\frac{1}{10}$ ths, on support, with reservoir, special clamp and rubber tubing..... 7.00

41096. Apparatus for the Gasometric Determination of Aliphatic Amino Groups, Van Slyke. See *Journal of Biological Chemistry* XII, p. 275, 1911, and XVI, p. 121, 1913, also *Abderhalden's Handbuch der biochemischen Arbeitsmethoden*, V, p. 995, and VI, p. 278. The nitrogen gas evolved from amino groups and nitrous acid in the reaction  $\text{RNH}_2 + \text{HNO}_2 = \text{ROH} + \text{H}_2\text{O} + \text{N}_2$  is purified and accurately measured in a gas burette. A complete determination of the  $\text{NH}_2$  nitrogen of amino acids requires but six to ten minutes, and the accuracy is equal to that of a Kjeldahl determination. An indefinite number of successive determinations can be performed without disconnecting any of the parts. The apparatus permits analysis of any volume of solution up to 10 cc and give results with an accuracy of  $\frac{1}{10}$ th mg. of nitrogen. This method has been applied to varied problems, among which are study of protein digestion, both *in vitro* and *in vivo*; the determination of the nature of the amino acids yielded by hydrolysis of small amounts of protein, determination of free amino groups in fixing the constitution of various organic substances; and the determination of amino acid nitrogen in urine, blood and tissues. Complete with glass parts and supports, pulley, shaking device, etc., but without motor..... 25.00

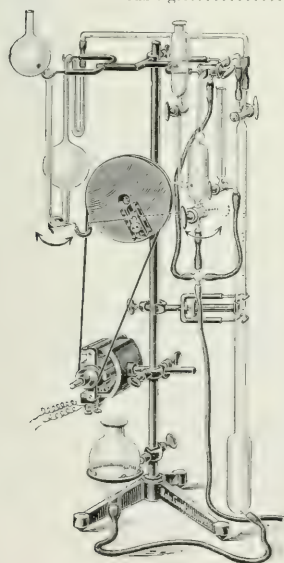
Extra glass parts

41100. Reaction Vessel with filling funnel, burette and three glass stop-cocks..... 8.75

41104. Gas Burette, Schellbach, with three-way cock, levelling bulb and tubing..... 4.50

41108. Gas Pipette, new form, for shaking..... 1.50

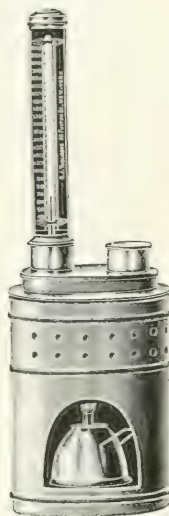
Note—We recommend our Motor No. 40884 suitable for connection to house circuit instead of that shown in the illustration which is intended to work on accumulators.



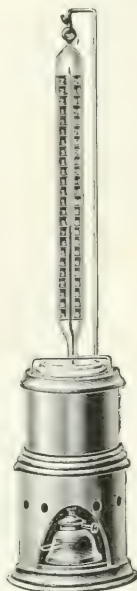
No. 41096



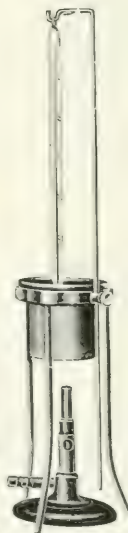
No. 41200



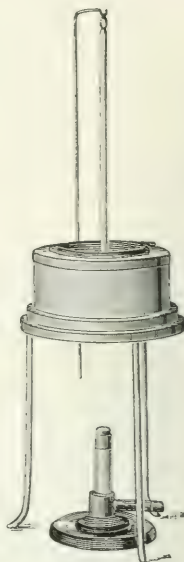
No. 41204



No. 41208



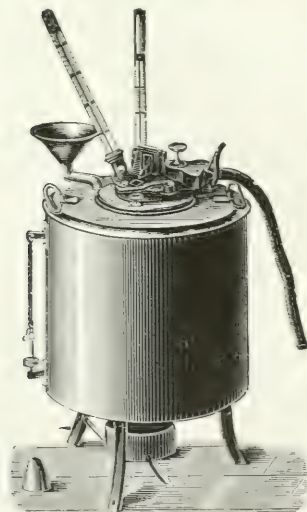
No. 41212



No. 41216

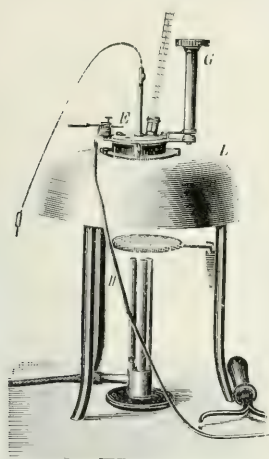
# OIL TESTING APPARATUS

41200.	Fire Tester, Elliott, for the flashing point of illuminating oil, only. With thermometer.....	11.70
41204.	Fire Tester Foster, for the flashing point of illuminating oil only. With thermometer.....	13.50
41208.	Fire Tester, open form, for the flash point of illuminating oil, with thermometer.....	5.85
41212.	Fire Tester, Cleveland open form, small size, complete with thermometer.....	9.00
41216.	" " " " large model, a most substantial tester. Complete with thermometer 50° to 640° F., alcohol lamp and Bunsen burner.....	13.50

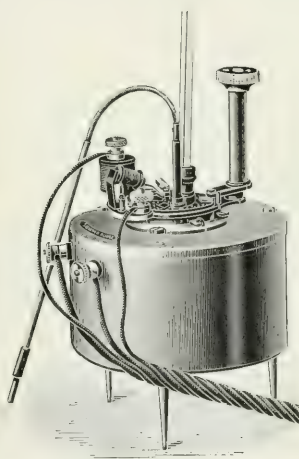


No. 41220

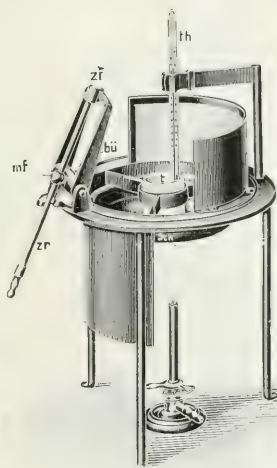
41220.	Flash Point Tester, Abel-Pensky, for petroleum, latest model, with clockwork for opening cover and for depressing the test flame, with certificate of the Kaiserlichen Normal-Eichungs-Kommission; with one standard thermometer 10-55° C. and one 50-75° C. and aneroid barometer 65.00	
41224.	Standard Thermometer only for above, 10-55° C., with metal fitting and P. T. R. certificate.....	4.50
41228.	Standard Thermometer only for above, 50-75° C., with metal fitting and P. T. R. certificate.....	4.50
41232.	Flash Point Tester, Abel-Pensky, for both high and low temperatures. This outfit is identical with No. 41220 except that the joints of the heating bath are hard brazed and it is supplied with an additional pair of thermometers for high temperatures, i. e. one from 50-160° C. for the oil bath and one from 70-200° C. for the water bath, and is arranged for both gas heating and gas ignition, with certificate of the Kaiserlichen Normal-Eichungs-Kommission.....	80.00
41236.	Thermometer, only, for above, 50-160° C.....	4.00
41240.	" " " " 70-200° C.....	4.00
41244.	Flash Point Tester, Abel-Pensky, for benzene, benzole, etc., with oil cup, similar in arrangement to No. 41220 and with two thermometers - 30 to + 40°C.....	40.00
41248.	Thermometer only for above - 30 to + 40° C.....	3.50



No. 41252



No. 41258

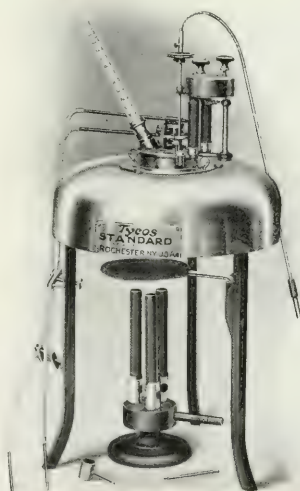


No. 41272

41252. Flash Point Tester, Pensky-Martens, for heavy oils, latest model, for gas heating, with thermometer from 80-250° C. .... 45.00
41256. Thermometer, only, for above, 80-250° C., with P. T. R. certificate. .... 6.50
41260. " " " 40-160° C., " " " for low temperatures. .... 5.00
41264. " " " 200-400° C., " " " high " .... 8.00
41268. Flash Point Tester, Pensky-Martens, for heavy oils, exactly the same as No. 41252 but with electric heating and ignition; for either 110 or 220 volt circuit. Voltage must be specified in ordering. With adjustable resistance, connecting cord, socket and switch and one certified thermometer 80-250° C. With this electric heating device the crucible may be heated to 100° C. in seven minutes and to 400° C. in twenty-five minutes. .... 110.00
41272. Flash Point Tester, open crucible form, for gas heating and gas ignition; with one thermometer from 80 to 280° C., porcelain crucible and adjustable burner. .... 22.50



No. 41276

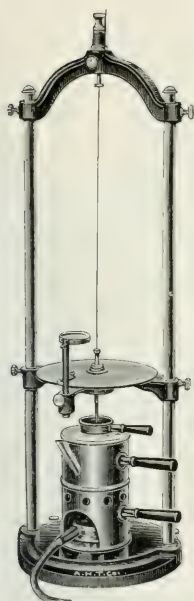


No. 41280

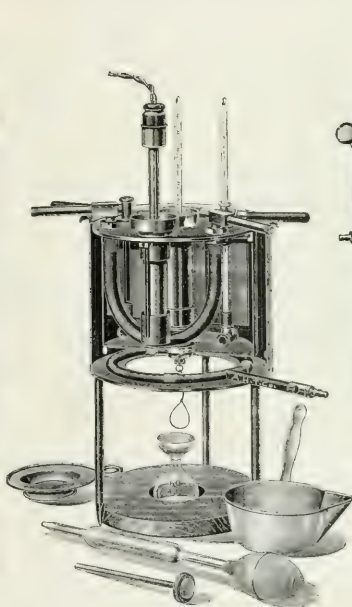
41276. Flash Point Tester, U. S. Bureau of Mines Model, for low burning oils, complete with three thermometers, aneroid barometer, instructions and portable carrying case ..... 135.00
41280. Flash Point Tester, U. S. Bureau of Mines Model, for high burning oil, with two thermometers and instructions, in portable case. .... 120.00



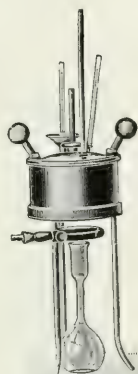




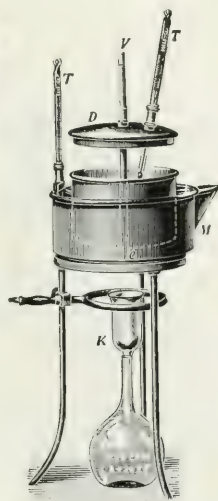
No. 41332



No. 41340

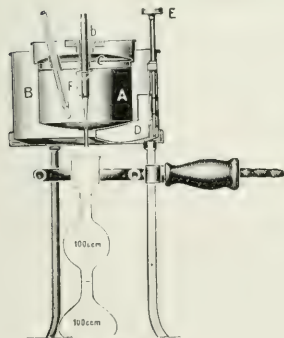


No. 41356



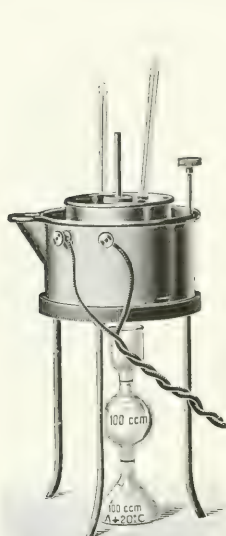
No. 41352

41332. Viscosimeter, Doolittle Torsion, improved, for measuring the viscosity or fluidity of oils, varnish, starch, glucose, glue, or any fluid whether containing solid particles in suspension or not. See *Journal of the American Chemical Society*, Vol. XV, 1893, pp. 172 and 145. Complete..... 75.00
41336. Viscosimeter, Saybolt Universal, original make and design..... 60.00
41340. Viscosimeter, Saybolt Universal, Improved Model, for testing cylinder, valve and similar oils with bath at 212° F and the oil at 210° F, for reduced black oils with oil at 130° F and for testing neutral, spindle, paraffine, red and other distilled oils with oil at 100° F or with oil at any temperature from 70° F to 212° F. The Viscosimeter is now furnished with an electric heating element for either 110 or 220 volt lighting circuit with cord and plug for lamp socket (voltage must be specified in ordering) and is also furnished with the usual gas heating arrangement as shown in illustration and also with a U-tube steam heater..... 75.00
41344. Extra Flask, graduated, 60 cc capacity..... 1.25
41348. Extra Thermometers, each..... 1.75
41352. Viscosimeter, Engler, with gold plated oil cup and platinum outlet tube, two certified thermometers, 10-50° C. and 10-150° C., ring burner, tripod and 200 cc certified flask with one mark; with certificate of the Kaiserlichen Normal-Eichungs-Kommission..... 38.00

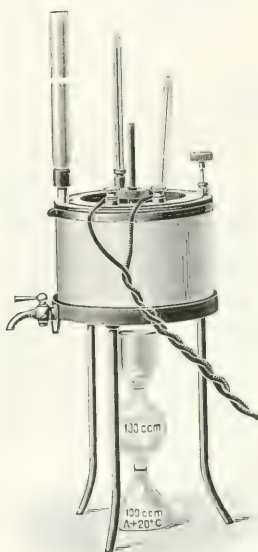


No. 41360

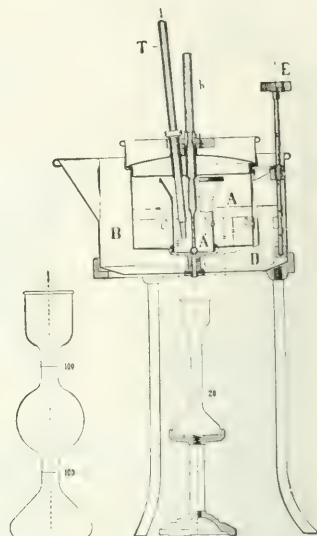
41356. Viscosimeter, Engler, for High Temperatures, similar to No. 41352 but with hand brazed bath and enclosed steam jacket; with two certified thermometers, 180-300° C and 200 cc certified flask with one mark, tripod and ring burner; with certificate of the Kaiserlichen Normal-Eichungs-Kommission..... 55.00
41360. Viscosimeter, Engler, Improved Model, according to the specifications of the Petroleum Congress. This instrument differs from No. 41352 in that the oil bath is totally immersed in the water bath and the lid of the oil bath is doubled walled. The water bath is also provided with a stirrer D. The water bath is wider, permitting a more constant temperature and the special device F is provided to control the opening of the outlet tubulation; with two certified thermometers, 10-50° C and 10-150° C, 200 cc certified flask with two marks, tripod and ring burner; with certificate of the Kaiserlichen Normal-Eichungs-Kommission..... 46.50



No. 41364

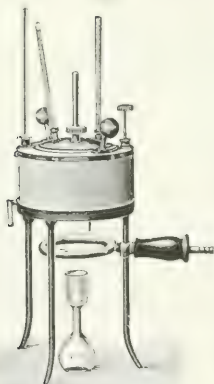


No. 41368



No. 41372

41364. Viscosimeter, Engler, Improved Model for Electric Heating. With two certified thermometers, 10-50° C and 10-150° C, adjustable resistance for maintenance of constant temperature, 200 cc certified flask with two marks, tripod; and certificate of the Kaiserlichen Normal-Eichungs Kommission. *Voltage must be specified in ordering.* 86.25
41368. Viscosimeter, Engler, Improved Model for High Temperatures, for Electric Heating, with enclosed bath in asbestos jacket, deflator and outlet stopcock, with two certified thermometers, 100-300° C and 100-350° C, tripod, 200 cc certified flask with two marks and adjustable resistance. With certificate of the Kaiserlichen Normal-Eichungs Kommission. *Voltage must be specified in ordering.* 101.50
41372. Viscosimeter, Engler, Improved Model, for Small Quantities. 20 cc of oil is required for the test instead of 200 cc. By this arrangement much time is saved in the testing of thick oils by diminishing the time of outflow. Otherwise the instrument is similar to No. 41360. With 2 certified flasks, one of 200 cc with two marks and one of 20 cc with one mark; with support, tripod, gas burner and 2 certified thermometers. 10-50° C and 10-150° C. With certificate of the Kaiserlichen Normal-Eichungs Kommission. 70.00
41376. Viscosimeter, Engler, for Electric Heating. Otherwise as above, with adjustable resistance, and certificate of the Kaiserlichen Normal-Eichungs Kommission. *Voltage must be specified in ordering.* 109.50

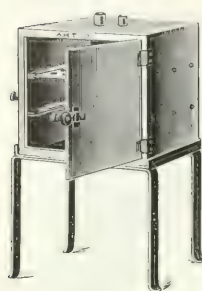


No. 41388

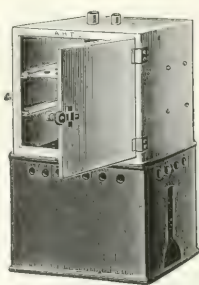
41380. Viscosimeter, Ubbelohde, for Illuminating Oils, for the testing of which the regular Engler Viscosimeter is not well adapted. The oil cup is wider and the same is provided with an overflow tube for bringing the oil to the correct height and the outlet tube is of greater length and of smaller diameter than for lubricating oils; with two certified thermometers 50° and 100° C, 100 cc certified flask with one mark, gas burner and tripod. 34.50
41384. Viscosimeter, Ubbelohde, for Illuminating Oils, for Electric Heating. Otherwise as above. With adjustable resistance. *Voltage must be specified in ordering.* 74.25
41388. Viscosimeter, Ubbelohde, for Cylinder Oils. This is similar in construction to the Petroleum Viscosimeter No. 41380 but the joints are hard brazed for high temperatures and the water jacket is enclosed in asbestos and furnished with cover and stirring device. With two certified thermometers, 100-300° C and 180-300° C, measuring flask 100 cc with one mark, tripod and ring burner. 47.50
41392. Viscosimeter, Ubbelohde, for Cylinder Oils, for Electric Heating. Otherwise as above. With adjustable resistance. *Voltage must be specified in ordering.* 86.75



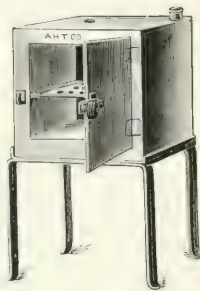




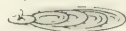
No. 41500



No. 41504



No. 41508

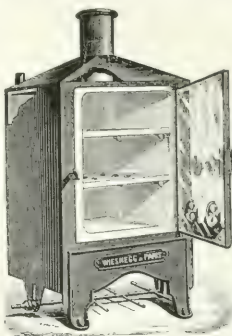


No. 41516

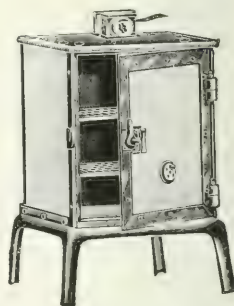
41500. Oven, Single Wall, of heavy sheet copper, on wrought iron stand, with extra sheet iron bottom to prevent burning out. With perforated shelf.  
Inside dimensions, inches..... 6 x 8      8 x 10      10 x 12      12 x 16  
Each..... 5.00      7.00      10.00      15.00
41504. Oven, Single Wall, exactly same as No. 41500 but with enclosed sheet iron base.  
Inside dimensions, inches..... 6 x 8      8 x 10      10 x 12      12 x 16  
Each..... 6.00      8.00      12.00      18.00
41508. Oven, Double Wall, providing space for water jacket. Otherwise same as No. 41500.  
Inside dimensions, inches..... 5½ x 5½      7½ x 7½      9½ x 9½  
Each..... 8.00      10.00      14.00
41512. Oven, Double Wall, exactly same as No. 41508 but with enclosed sheet iron base.  
Inside dimensions, inches..... 5½ x 5½      7½ x 7½      9½ x 9½  
Each..... 9.00      11.00      15.00
41516. Cylindrical Rings on top so that oven may be used as a water bath. For all sizes. Extra..... 1.50
41520. Steam Coil for heating water in the jacket of 41508 and 41512 by direct connection with steam supply.  
For all sizes. Extra..... 18.00



No. 41524

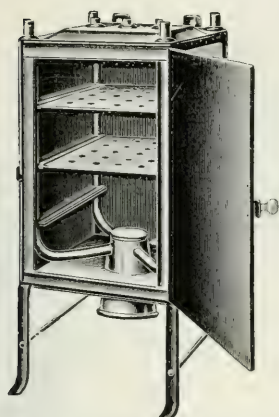


No. 41528

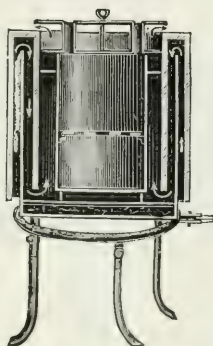


No. 41536

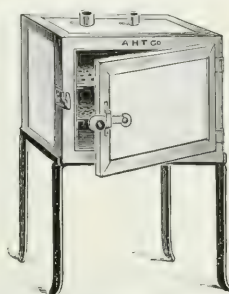
41524. Oven, Rammelsberg, cylindrical form, of polished copper, 6 in. high x 5 in. diameter..... 3.50
41528. Oven, Double Wall, Wiesnegg original French make. Inside chamber is of heavy, solid porcelain in one piece, with porcelain shelves. The inside porcelain frame fits tight against the plate glass door so that no corrosive parts are exposed to the inside of the chamber. As supplied by us to the U. S. Department of Agriculture, Bureau of Chemistry, Food Inspection Laboratories. Inside dimensions 29 x 25 x 24 cm. With adjustable burner.  
Duty Free..... 33.00      Stock..... 50.00
41532. Oven, Single Wall, of heavy asbestos wood, set in metal frame. A removable sheet metal plate forms the bottom of the oven. The rack for the shelves and frame of the door are of cast aluminum, being non-corrosive. With perforated asbestos shelves adjustable to any height. For either gas or electric heating. For Gas Heating.  
Inside dimensions, inches..... 10 x 10 x 12      18 x 12 x 14  
Each..... 16.50      22.50
41536. Oven, Single Wall, for Electric heating, otherwise exactly as above..... 25.00      35.00



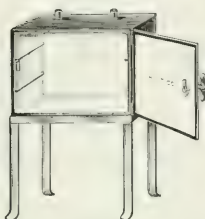
No. 41540



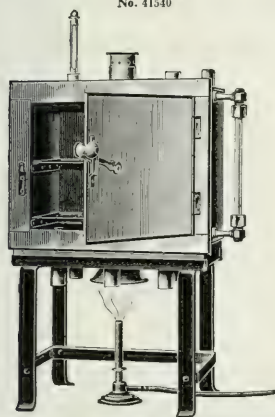
No. 41544



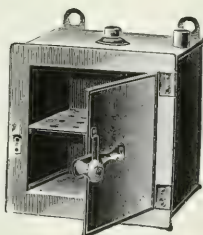
No. 41550



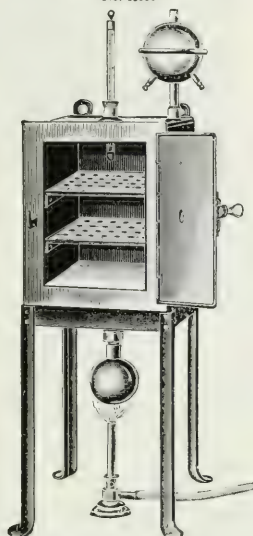
No. 41564



No. 41554

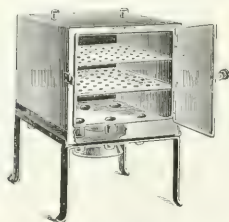


No. 41558

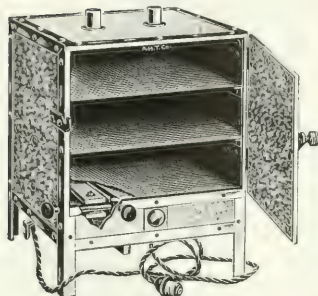


No. 41562

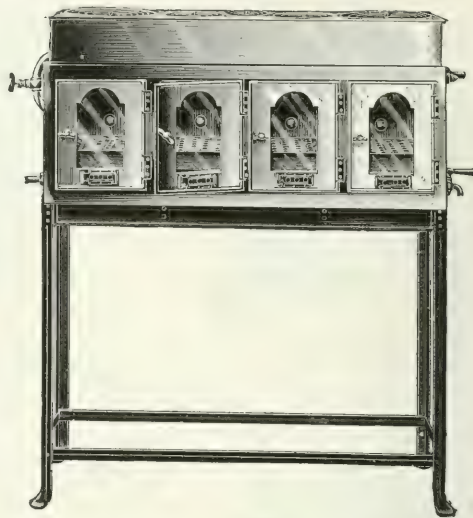
- |        |  |                           |
|--------|--|---------------------------|
| 41540. | Oven, Kaehler, Single Wall, of sheet iron covered with asbestos. The heat is distributed evenly throughout the interior chamber by means of tubes from the dome over the burner. Inside dimensions 30 x 30 x 45 cm.  | 40.00                     |
| 41544. | Oven, Lothar Meyer, consisting of three cylindrical walls with ventilation for hot air and with top and bottom insulated with infusorial earth. The inner cylindrical compartment may be removed. On stand with ring burner. Size 20 x 30 cm. Of iron.   | 20.00                     |
| 41546. | Oven, Lothar Meyer, as above, but of copper.   | 32.00                     |
| 41550. | Oven, Drying, Single Wall, of copper throughout with asbestos covering. Size 10 x 8 x 8 inches. As used by the Barrett Mfg. Co. for their tar and pitch testing in connection with their special apparatus for this purpose.   | 19.00                     |
| 41554. | Oven, Double Wall, High Temperature. Can be used up to 120° C. when glycerine, toluol or other high boiling point material is used in the jacket instead of water. With water gauge and ventilating system. 20 x 25 x 18 cm.   | 30.00                     |
| 41558. | Oven, Double Wall, High Temperature, for temperatures up to 300° C. when filled with oil or other material of high boiling point. Inside dimensions 15 x 15 x 15 cm. On stand not shown in cut.  | 17.00                     |
| 41562. | Oven, Double Wall, Abati, Constant High Temperature. With xylol used in the jacket a constant temperature of 136° C. can be attained and with mixture of xylol and cumol, 150° C. With heating bulb and spherical condenser, but without thermometer or burner. Inside dimensions 6 x 6 x 8 inches. Duty Free. | 26.40                     |
|        |  | Duty Paid.                |
| 41564. | Oven, Drying, Single Wall, lined throughout with white, acid resisting enamel, with stand and aluminum shelf not shown in illustration. Inside dimensions, cm.   | 20 x 15 x 15 35 x 25 x 25 |
|        | Each.  | 7.50 12.50                |



No. 41668



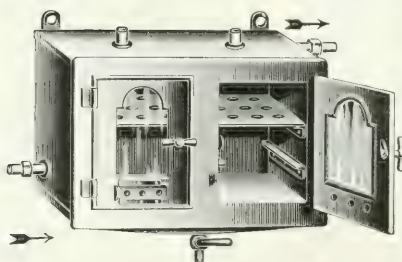
No. 41672



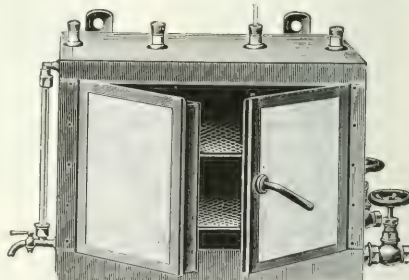
No. 41676

41668. Oven, Single Wall, Kaehler, of polished copper, with double bottom providing a circulation system and a constant temperature. Inside dimensions 10 x 10 x 12 inches. . . . . 25.00
41672. Oven, Electric, Sargent Patent, with automatic temperature control. Of asbestos material with metal trimmings. Temperature can be set at any point between 70° C. and 150° C. and will be maintained to within about 1° C. Heating units are easily replaceable. Plug is attached to ordinary lamp socket on either 110 or 220 volt current. Voltage must be specified in ordering. Inside dimensions 10 x 10 x 12 inches. Complete with cord, plug, thermometer and directions. . . . . 25.00
41676. Oven, Double Wall, for Steam Heating by direct connection with steam supply. Consisting of four drying compartments 8 x 10 inches, with massive brass doors; surmounted by a copper water bath carrying 5 sets of rings. The inside of the apparatus is made of zinc lined copper and distilled water can be used after being drawn off. . . . . 105.60

Duty Paid. . . . . 128.00



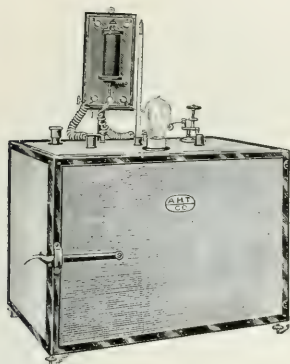
No. 41680



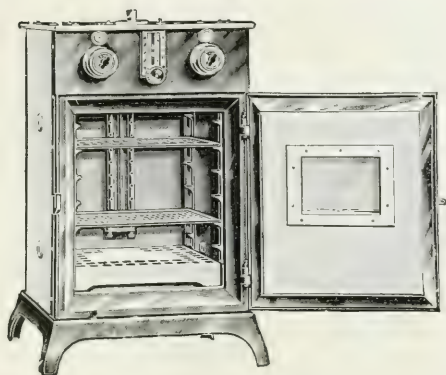
No. 41682

41680. Oven, Double Wall, for Steam Heating by direct connection with steam supply. Made of copper, with massive brass doors and inside compartments zinc lined. With safety valve and cock underneath for emptying. Compartments are each 10 x 8 x 8 inches inside.
- |                                 |       |       |
|---------------------------------|-------|-------|
| Number of compartments. . . . . | 2     | 3     |
| Duty Free. . . . .              | 41.25 | 59.40 |
| Duty Paid. . . . .              | 50.00 | 72.00 |
41682. Oven, Double Wall, for Steam Heating by direct connection with steam supply. Of copper with copper steam coils, water gauge, double doors and asbestos covering.
- |                    |              |              |              |              |
|--------------------|--------------|--------------|--------------|--------------|
| Size, cm. . . . .  | 15 x 25 x 15 | 20 x 30 x 20 | 25 x 40 x 25 | 30 x 50 x 30 |
| Duty Free. . . . . | 19.80        | 26.40        | 45.00        | 67.50        |
| Duty Paid. . . . . | 26.40        | 35.20        | 60.00        | 90.00        |





No. 41681

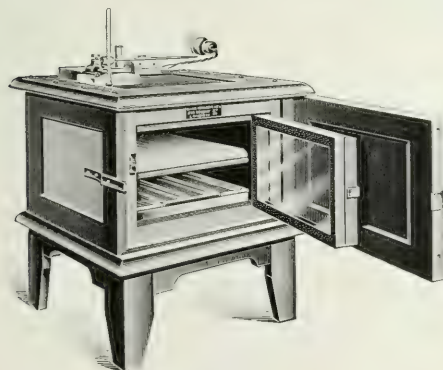


No. 41688

- 41684. Oven, Electric,** with automatic expanding disc temperature regulator and magnetic circuit breaker. Of heavy asbestos board mounted in solid brass frame, giving a durable and rigid construction. Heating units are wound on hard porcelain and are easily replaceable, as is the expanding disc. The temperature control will regulate within 1° or 2° C. over long periods of time and is recommended as a thoroughly practical and satisfactory utensil which we have supplied to many important laboratories. Works equally well on direct or alternating current. Inside dimensions 16 x 10 x 9 inches. As regularly sent out the expanding disc will regulate from 75° C. to 160° C. Special windings of heating units and special capsules for other ranges of temperature, when desired. With diagram of connections and full information for operating.
- |                  |       |       |
|------------------|-------|-------|
| For voltage..... | 110   | 220   |
| Each.....        | 70.00 | 72.00 |

**OVENS, FREAS PATENT ELECTRIC,** with temperature control, as approved by the National Board of Fire Underwriters. May be set for any temperature desired from a degree or so above room temperatures to 175° C. Made of heavy, fire-proof asbestos wood which is not attacked by acids or alkalis. The temperature indicator is set at the temperature desired by turning the milled head as shown in illustration. The metal fittings of door, base, etc., are of aluminum. When ordering please state voltage and current of circuit on which oven is to be operated.

- 41688. Oven, Freas Patent Electric No. 100.** Size of chamber 12 x 12 x 12 inches. Mounted on cast iron base for placing on table. Complete with flexible cord and plug to attach to regular lighting circuit. .... 75.00
- 41692. Oven, Freas Patent Electric No. 110.** Inside dimensions 14 x 17 x 18 inches. Mounted on heavy iron base with legs, total height 5 ft. Complete with flexible cord and plug. .... 165.00
- 41696. Oven, Freas Patent Electric No. 114,** same as No. 110 but graduated for temperatures up to 500° F. as used in the evaporating tests of asphalt, etc. .... 175.00

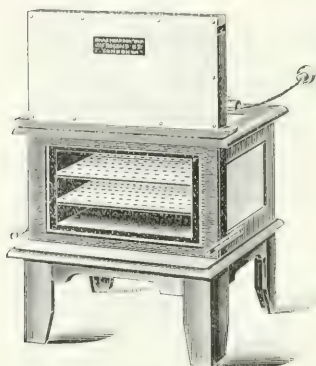


No. 41700

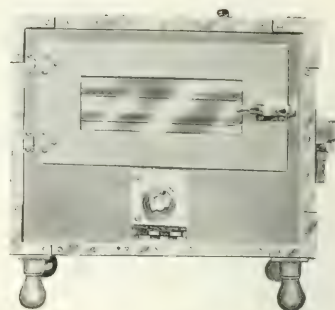
- 41700. Oven, Hearson Electric,** specially designed for rapidly ascertaining the percentage of moisture in flour, tobacco, seeds and similar material. The oven is regularly sent out for operation at 115° C. but may be adjusted from 15° C. to 150° C. The air in the inner compartment is uniformly heated and passes over the trays containing the samples to be tested, taking up in its passage the moisture which is driven off, the whole being discharged through outlets at the back of the apparatus; with Hearson' Patent Capsule by means of which temperature variation may be kept to within 1° C. Inside dimensions 6 x 11 x 11 inches. Complete with thermostat, capsule, thermometer, two shelves, eight trays, wall plug and 3 ft. of flexible cord. Please specify voltage in ordering.

Duty Free.....	100.80
Duty Paid.....	151.20





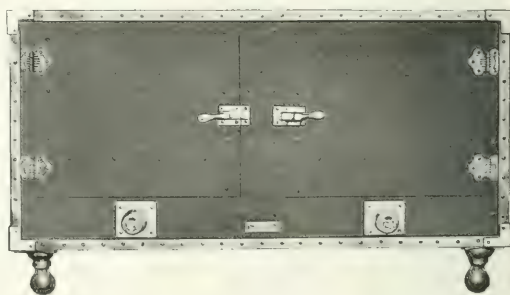
No. 41704



No. 41708



No. 41712



No. 41716

41704. **Oven, Hearson Electric**, similar in construction to above but specially arranged for testing tobacco. Complete with thermostat, capsule, thermometer, two perforated shelves, wall plug and 3 ft. of flexible cord. Please specify voltage in ordering.

Duty Free

100.80

Duty Paid

151.20

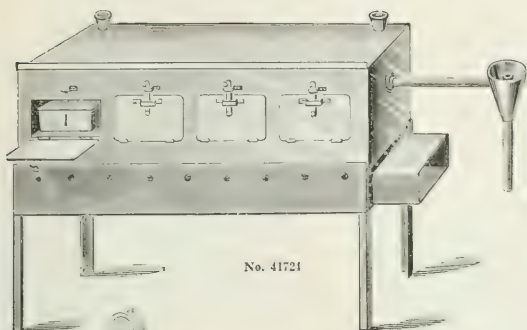
**OVENS, DESPATCH, ELECTRIC.** This series of Ovens is constructed of polished steel with nickel plated angle iron corner fittings and walls of asbestos from 1 to 2 inches apart, depending upon the size of the oven, packed with mineral wool. They have open wire heating units guaranteed not to burn out or crack. The alloy from which this wire is made does not oxidize at high temperatures or become brittle with repeated heating and cooling. These Ovens are provided with ventilators at both top and bottom designed especially for the carrying off of moisture, as in drying out of samples, thus expediting the drying process and enabling a very accurate temperature control without the use of a thermostat or other regulating device. The ovens are all provided with a three-heat switch and by adjustment of the ventilator the temperature can be maintained from 90° to 100° C. on the low point, 100° to 108° C. on the middle point and 140° to 150° C. on the high point, 150° C. being the highest temperature for which they are regularly built. The current consumption is exceedingly small, as will be noted from the data given below. These Ovens are widely used in the moisture test of soils, etc., Pekar slick tests in flour and baking laboratories and for testing sulphite in pulp mills as to moisture. The Ovens operate equally well on direct or alternating current but voltage must be specified in ordering.

41708. **Oven, Despatch, Electric**, as above described, with glass window for observation of the material during drying, with drying space 16 x 7 x 8 inches; current consumption 75 150-300 Watts.... 32.00

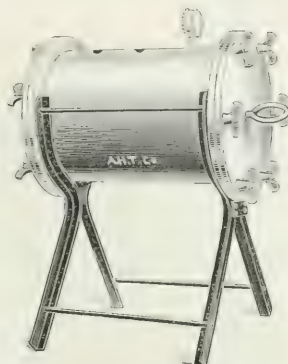
41712. **Ovens, Despatch, Electric**, as above, with removable shelves and thermometer.
- | Inside dimensions, inches.....             | 13 x 12 x 18 | 12 x 9 x 16 | 11 x 6 x 16 |
|--|--------------|-------------|-------------|
| Number of shelves.....                     | 4            | 3           | 2           |
| Continuous current consumption, Watts..... | 150          | 100         | 100         |
| Each.....                                  | 85.00        | 80.00       | 75.00       |

41716. **Ovens, Despatch, Electric, Compartment**, specially designed for moisture test of soils.
- | Inside dimensions of each compartment, inches.....          | 20 x 16 x 18 | 20 x 60 x 18 |
|---|--------------|--------------|
| Number of compartments.....                                 | 2            | 3            |
| Maximum current consumption of each compartment, Watts..... | 150          | 150          |
| Each.....   | 175.00       | 215.00       |

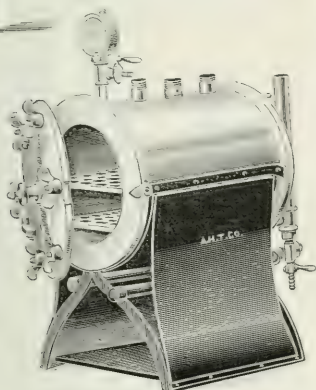
41720. **Oven, Despatch, Electric, Triple Compartment**, as above, specially designed for sulphite test in pulp mills. Inside dimensions of each compartment 14 x 9 x 20 inches, current consumption of each compartment 100 Watts.... 215.00



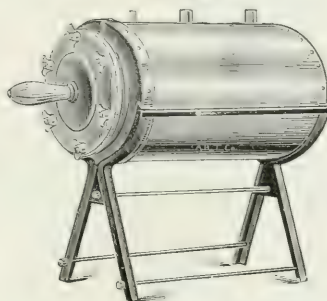
No. 41721



No. 41728

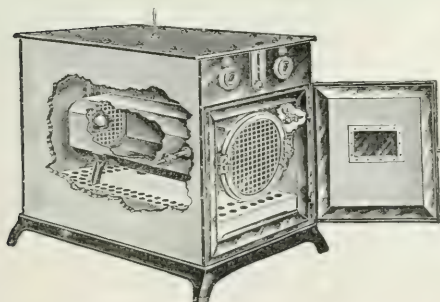


No. 41732



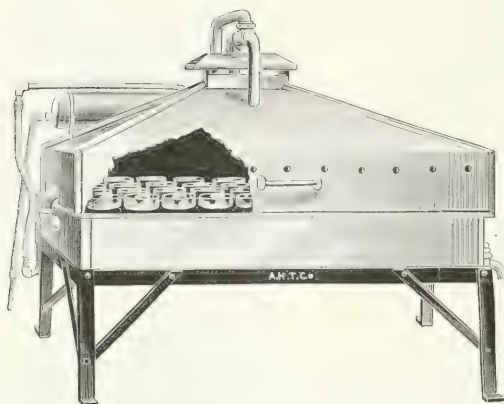
No. 41736

41724. **Oven, Double Wall, Blair, of copper, on sheet iron base.** As used in iron analysis; 24 inches long x 7 inches high and 7 inches deep. With four compartments  $4\frac{1}{2} \times 6 \times 2\frac{1}{2}$  inches, with constant water level. Each compartment is supplied with a copper box  $4 \times 4\frac{1}{2} \times 1\frac{1}{2}$  inches, with serial number **40.00**
41728. **Oven, Single Wall, for Vacuum, Carr.** Inside dimensions 12 x 8 inches, with copper shelf, vacuum gauge and openings for thermometer and thermostat. Made of heavy brass, with tightly clamping door. See Wiley's "Agricultural Products," Vol. III, p. 23. .... **65.00**
41732. **Oven, Double Wall, for Vacuum, for either steam or gas heating, inside dimensions 16 inches long by 8 inches in diameter.** These ovens are widely used in various laboratories of the U. S. Department of Agriculture, sugar laboratories, etc., and are of robust and substantial construction intended for continuous operation in vacuum work. The body of the oven is a large cylindrical brass tube surrounded by 1 inch steam space or jacket built to withstand 40 lbs. pressure. The oven is provided with two perforated pipe burners for gas heating and a constant level for the water in the jacket is placed in the rear. Suitable openings for exhaust of air and moisture from the chamber, thermometer and vacuum gauge are provided. .... **175.00**

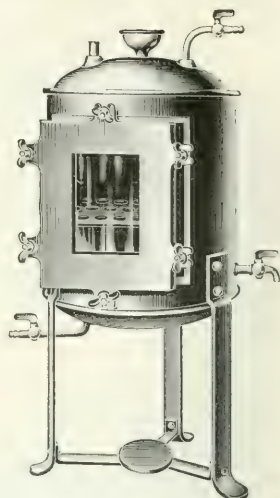


No. 41740

41736. **Oven, Double Wall, cylindrical form, for drying in current of hydrogen etc.** Substantially made, of heavy copper and provided with one shelf. Inside dimensions  $17 \times 6\frac{1}{2}$  inches. May also be used with glycerine or toluol in jacket and for temporary vacuums up to about 20 inches of mercury but not for high or continuous vacuum .... **40.00**
41740. **Oven, Freas Patent Electric for Vacuum.** Inside dimensions of vacuum chamber  $8 \times 8 \times 18$  inches. Temperature range up to  $180^{\circ} \text{C}$  .... **250.00**

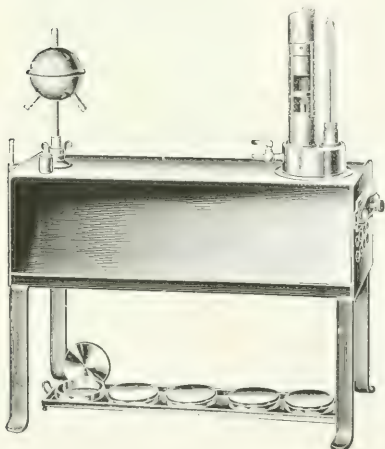


No. 41741

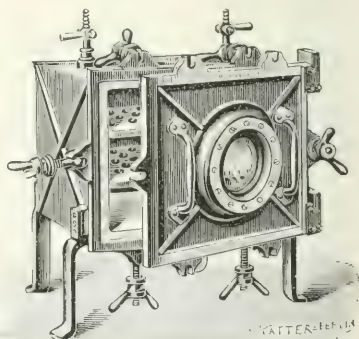


No. 41752

41744. **Oven, Drying, Alsop.** Designed for and widely used in tanning laboratories. Will accommodate 110 No. 26012 crystallizing dishes. Of heavy copper with condenser at side to supply distilled water. With steam outlet at top. Size 35 x 25 inches. For gas heating. . . . . 135.00
41748. **Oven, Drying, Alsop,** same as above but with coil for steam heating. . . . . 140.00
41752. **Oven, for Vacuum, Sidersky,** improved model, consisting of a double walled chamber with heavy metal door with plane glass inset. Inside dimensions 260 x 300 mm. . . . .
- |                          |                          |
|--------------------------|--------------------------|
| Duty Free. . . . . 66.00 | Duty Paid. . . . . 80.00 |
|--------------------------|--------------------------|

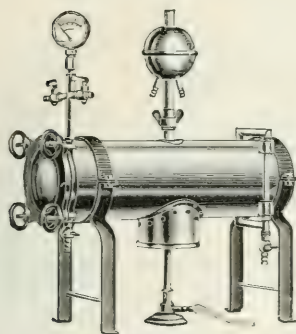


No. 41756

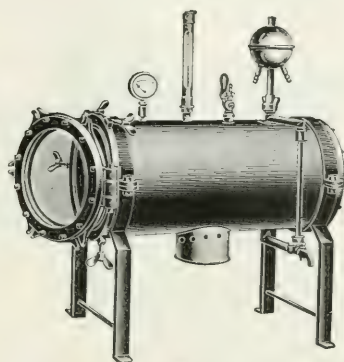


No. 41760

41756. **Oven, Soxhlet,** of polished copper, improved model with eight tubes, ball condenser, draft chimney and tray with five nickel dishes. Drying chamber is 50 x 100 x 3½ cm. The tubes supplying heat to the chamber lie in a bath which is filled with a high boiling point material such as salt solution, glycerine, toluol, etc., according to the temperature desired. As used in the rapid determination of total solids in milk and other experiments. . . . .
- |                          |                          |
|--------------------------|--------------------------|
| Duty Free. . . . . 36.30 | Duty Paid. . . . . 45.00 |
|--------------------------|--------------------------|
41760. **Oven, Vacuum,** of heavy cast brass. With glass door, and interior lined with zinc. Inside dimensions 25 x 25 x 25 cm. . . . .
- |                          |                           |
|--------------------------|---------------------------|
| Duty Free. . . . . 90.75 | Duty Paid. . . . . 110.00 |
|--------------------------|---------------------------|

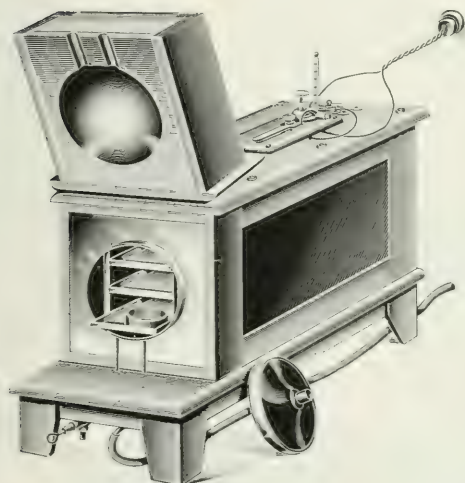


No. 41761



No. 41772

41764. Oven, Double Wall, for Vacuum, for gas heating, cylindrical form. Space between the walls may be filled with glycerine, toluol, etc., when high temperatures are required. Of heavy copper, tinned on inside. Inside dimensions 95 x 405 mm. With vacuum gauge and ball condenser but without burner.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 40.00 | Stock | 45.00 |
|-----------|-------|-------|-------|
41768. Oven, Double Wall, for Vacuum, as above, but for indirect steam heating with valves and connections.
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 45.00 | Duty Paid | 60.00 |
|-----------|-------|-----------|-------|
41772. Oven, Double Wall, for Vacuum, cylindrical form, with heavy plate glass at each end and door fastened by clamps. With thermometer in metal mounting, manometer, reflux condenser and two removable shelves. For gas heating. Size 180 x 410 mm.
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 66.00 | Duty Paid | 88.00 |
|-----------|-------|-----------|-------|
41776. Oven, Double Wall, for Vacuum, of the same general construction as No. 41772 but extra large size, i.e., 600 x 300 mm inside dimensions. Massive construction with heavy plate glass at each end. May be fitted for direct steam heating without extra cost. With gauge and reflux condenser.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 125.25 | Duty Paid | 155.00 |
|-----------|--------|-----------|--------|



No. 41780

#### 41780. Oven, Vacuum, Hearson Electric.

This apparatus consists of an inner cylindrical chamber, the exposed end of which is furnished with a loose cover which can be clamped to this end of it in order to hermetically close it when it is desired to exhaust the air.

The inner cylinder is surrounded by another cylinder of larger capacity, which is filled with paraffine (not oil). In the space between the two vessels there is also, coiled around the inner cylinder, a long fine copper tube one end of which terminates in the inner cylinder, whilst the other end is furnished with a small valve which will be found on the left-hand side below the apparatus. Another small tube connected with and terminating in the inner cylinder will be found on the right-hand side also below the apparatus.

The regulator and the thermometer both dip into the vessel of molten paraffine in which the inner vessel and copper tube are both also submerged. It will be found in practice that the inside temperature indicated by self-registering thermometers, is about

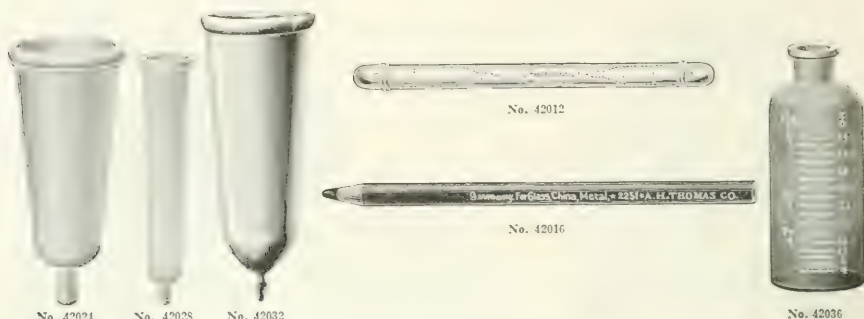
3 degrees above that shown on the scale of the thermometer outside when the inside is at 248 degrees Fah., allowance can be made accordingly if considered necessary.

The asbestos gaskets which serve to lute the cover should be painted frequently with black-lead mixed with turpentine. Air admitted to the inner cylinder through the small valve on the left is compelled to traverse the long length of copper tube before reaching the cylinder into which it is admitted at the back at practically the same temperature as that already in the interior. When the desired temperature is reached the electrical energy required to maintain it is only 60 Watts.

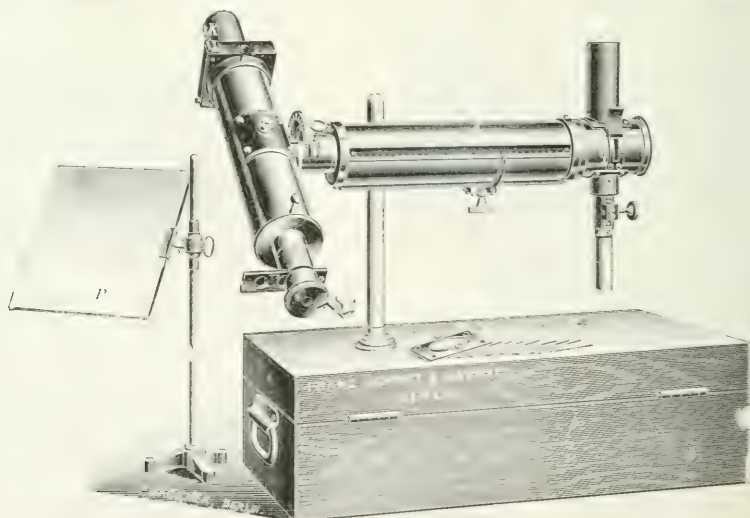
Duty Free..... 113.40

Duty Paid..... 170.10

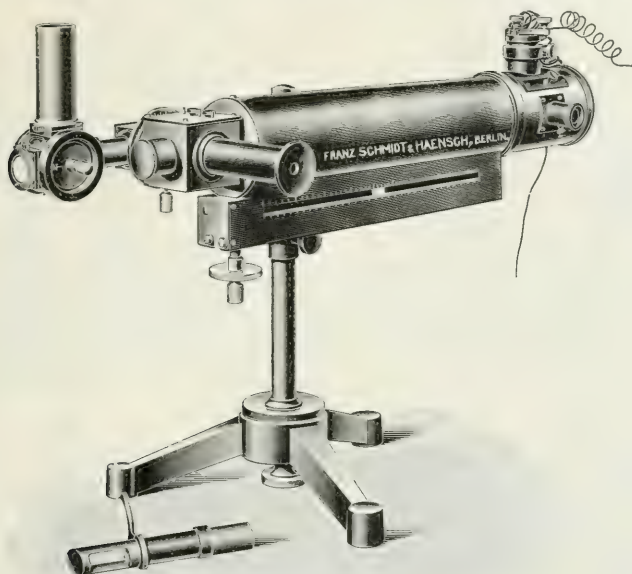




42000.	Paper, highly glazed on one side. Convenient for collecting filter ash, etc. In white, black, blue and yellow. Color must be specified in ordering. Sheets 20 x 24 inches. Per quire.....	.25
42004.	Paper, Parchment, for dialyzers, etc., medium weight, in sheets 375 x 250 mm. Per sheet.....	.10
42008.	" extra heavy, particularly selected for and used by the leading Antitoxin Laboratories for filtering antitoxin, serum, etc. Recommended as being the only thoroughly satisfactory paper for this purpose. In sheets 66 x 100 cm. Per sheet.....	.30
42012.	Pencil Litmus, Tyree, consisting of a red and a blue litmus pencil in metal case.....	.25
42016.	Pencils, Wax, best imported quality, for writing on glass, china, metal, etc. Selected especially for laboratory use and found highly satisfactory for this purpose. In white, blue, red and yellow. Color must be specified in ordering. Each.....	.10
42020.	Pencils, Wax, with the wax enclosed in hard rolled paper instead of wood. In white, blue, red or yellow. Please specify color in ordering. Each.....	.12
42024.	Percolators, conical shape of blown glass.	
	Capacity.....	$\frac{1}{2}$ pt. 1 pt. 2 pt. $\frac{1}{2}$ gal. 1 gal. 2 gal. 3 gal. 5 gal.
	Each.....	.40 .45 .50 .70 1.00 2.00 3.25 6.00
42028.	Percolators, cylindrical or Oldberg's shape, of blown glass.	
	Capacity.....	$\frac{1}{2}$ pt. 1 pt. 2 pt. $\frac{1}{2}$ gal. 1 gal. 2 gal. 3 gal.
	Each.....	.40 .45 .60 1.00 1.50 3.25 4.00
42032.	Percolators, with tubulation to fit $\frac{1}{4}$ inch rubber tubing.	
	Capacity.....	$\frac{1}{2}$ pt. 1 pt. $\frac{1}{2}$ gal. 1 gal. 2 gal.
	Each.....	.50 .60 .80 1.10 2.25
42036.	Percolator Bottle, graduated in cc. Capacity, cc.....	500 1000 2000 4000 8000
	Each.....	1.00 1.10 1.65 2.85 4.35



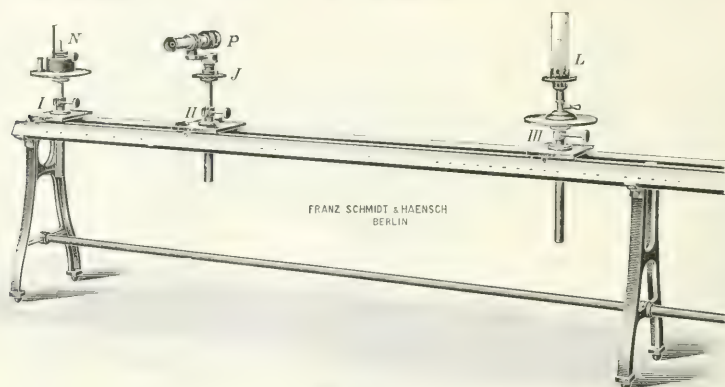
No. 42040—See description on following page



No. 42064

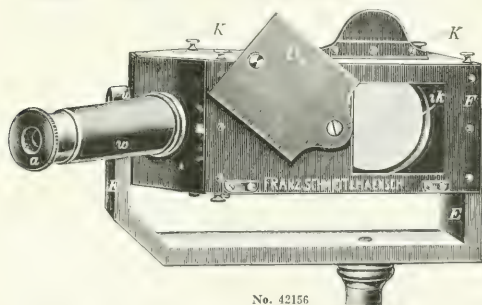
# PHOTOMETERS

		Duty Free	Duty Paid
42040.	Photometer, Weber Portable, Opal Glass Plate Type, with Lummer-Brodhun prism, for comparison by similarity; with benzene lamp and Prof. Weber's table of constants. Complete in portable case.....	120.00	160.00
42044.	Photometer, as above, but for comparison by both similarity and contrast... Accessories for Weber Photometer Nos. 42040 and 42044.	127.50	170.00
42048.	Standard Incandescent Lamp for 2 volts for use with above, interchangeable with benzene lamp, in mounting.....	21.00	28.00
42052.	Reflecting Mirror Attachment, to be put on in place of tube "K".....	9.00	12.00
42056.	Table of Constants for the mirror attachment.....	3.00	4.00
42060.	Adjustable Laboratory Tripod, for either of above Photometers.....	3.60	4.80
42064.	Photometer, Weber, Improved Tube Form, latest construction with Lummer-Brodhun prism, for comparison by both similarity and contrast, with adjustable opal glass plate in the tube, diaphragm arrangement, but without percentage graduation, standard lamp, plate box or receiving screen. See <i>Zeitschrift für Instrumentenkunde XXVII Jahrgang, Juni 1907</i> . (Copy of reprint sent on request).....	159.00	212.00
	Accessories for No. 42064 Weber Photometer.		
42068.	Percentage Graduation on above.....	4.50	6.00
42072.	Standard 2 Volt Lamp, in adjustable mounting as shown in No. 42064.....	21.00	28.00
42076.	" Benzene Lamp, in adjustable mounting as shown in No. 42040.....	27.00	36.00
42080.	Plate Box, for plates $\mu$ and $m$ , for the decimal extension of the range, etc. See <i>Zeitschrift für Instrumentenkunde, XXVII Jahrgang, Juni 1907</i> .....	43.50	58.00
42084.	Gypsum Plate, Gi.....	7.20	9.60
42088.	Plate Box, Weber model.....	15.00	20.00
42092.	" " " with divided scale and pointer.....	19.50	26.00
42096.	Table of Constants for either of the above plate boxes.....	7.50	10.00
42100.	Two Smoked Glasses in mounting, fitting in either of above plate boxes.....	7.50	10.00
42104.	Box for Smoked Glasses, to be used in place of Weber box.....	10.50	14.00
42108.	Improved Plate $\mu$ , for use in connection with Weber's plate box or the box for smoked glasses.....	7.20	9.60
42112.	Screen $\mu$ 1.....	7.00	20.00
42116.	Spherical Receiving Screen.....	27.00	36.00
42120.	Case for complete instrument.....	12.00	16.00
Note—	As a comprehensive outfit for the measurement of illumination and intensities, either in the open or in enclosed spaces, the makers recommend an outfit consisting of Nos. 42064, 42068, 42072, 42092, 42096, 42104, 42112 and 42120	249.00	332.00
Note—	For Weston precision millivolt and ammeters for use with the above see p. 201.		

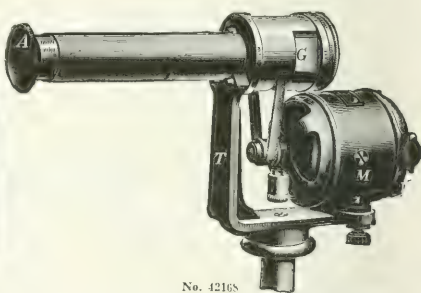


No. 42124

		Duty Free	Duty Paid
42124.	<b>Photometer Bench, Stationary</b> , latest construction, consisting of optical bench on three cast iron standards, with scale divided in millimeters from 0 to 2500 mm and with three adjustable riders I, II and III, but without standard lamp, N, sight-box P or gas burner L.....	145.50	194.00
	<b>Accessories for above Photometer Bench.</b>		
42128.	<b>Graduations in Direct Candle Power</b> , extra.....	15.00	20.00
42132.	<b>Scale</b> , divided from 20 to 3000 mm, extra.....	10.50	14.00
42136.	<b>Set of Six Screens</b> , for above Photometer, consisting of four with circular opening and two without opening.....	43.20	57.60
42140.	<b>Illuminating Device</b> for reading the scale, consisting of a small 2 volt Osram lamp arranged to illuminate only the portion of the scale to be read.....	10.80	14.40
42144.	<b>Holder for the Suspended Lamp</b> , to fit on the optical bench, with 1 meter of connecting cord.....	7.20	9.60
42148.	<b>Holder for Incandescent Lamp</b> , to hold the lamp to be tested in both vertical and horizontal position.....	30.00	40.00
42152.	<b>Rotator for Incandescent Lamp</b> , without motor.....	31.50	42.00

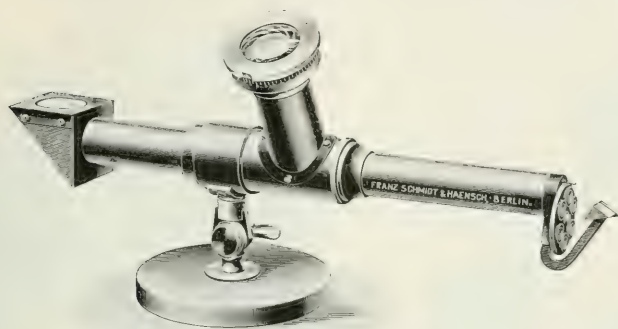


No. 42156



No. 42168

		Duty Free	Duty Paid
42156.	<b>Photometer Sight-box, Lummer-Brodhun</b> , for comparison by similarity.....	40.50	54.00
42160.	<b>Photometer Sight-box, Lummer-Brodhun</b> , for comparison by both similarity and contrast.....	46.50	62.00
42164.	<b>Photometer Sight-box, Lummer-Brodhun</b> , for measuring of light sources from different angles and with a crossline scale for sighting and concave lens for the ocular.....	60.00	80.00
42168.	<b>Photometer Sight-box, Flicker type</b> , including motor for 110 volts. See <i>Zeitschrift für Instrumentenkunde</i> , Februar 1905.....	48.00	64.00
42172.	<b>Photometer Sight-box</b> , same as above, but adjustable for use through an arc of 180° See <i>Zeitschrift für Instrumentenkunde</i> , August 1905.....	55.50	74.00
42174.	<b>Adjustment</b> for above, with horizontal graduations.....	7.50	10.00
42176.	<b>Photometer, Sight-box</b> , same as No. 42168 but reversible, with vertical circle and enclosed adjusting arrangement with horizontal circle.....	64.50	86.00
42180.	<b>Photometer Sight-box</b> , same arrangement as in No. 42176 but for use through an arc of 180°.....	72.00	96.00



No. 42200



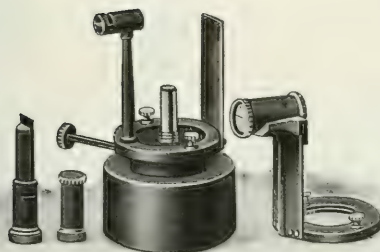
No. 42208



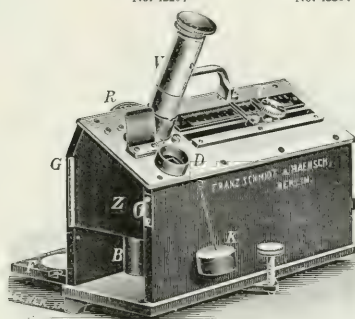
No. 42204



No. 42204



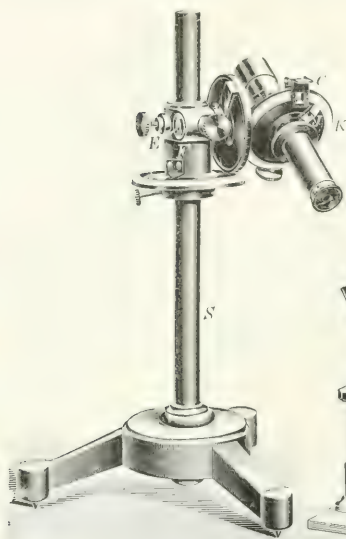
No. 42212



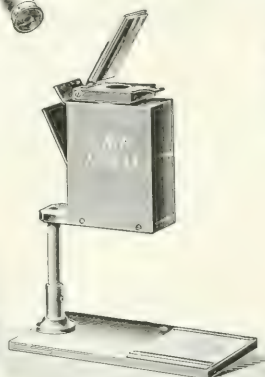
No. 42184

42184.	Illuminometer, or Relative Photometer, Martens, with benzene standard lamp and table of constants. See <i>Schilling's Journal für Gasbeleuchtung und Wasserversorgung</i> 1905.										Duty Free	Duty Paid
42188.	Illuminometer, Martens, as above, including a standard Osram lamp, but without accumulator or ammeter.										114.00	152.00
42192.	Additional Equipment, for above, arranged according to Dinessen for the measurement of illumination on the street, etc., consisting of a 3 cell Edison accumulator, Type F $\frac{1}{2}$ , two resistances, 1.7 ohms to 7 amperes and .4 ohms to 15 amperes, carrying case and two wooden boxes for the accumulators and the photometer, but not including photometer No. 42184 itself or ammeter.										120.00	160.00
42196.	Precision Amperemeter, type W. K. a; from 0.7 to 1.2 amperes, for use with above.										45.00	60.00
42200.	Relative Photometer, Weber, particularly recommended for the determination of illuminating values on school desks, work tables, etc. See <i>Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein, Band XV Heft 1</i> .... Extra for certificate and test curve by Prof. Weber.										30.00	40.00
42204.	Standard Incandescent Osram Photometer Lamps.										90.00	120.00
	Type.....	E	G	C	E	B	C	A	F	B	A	
	Hefner Candles.....	1	1	5	5	10	10	16	16	20	25	
	Color.....	red	white	red	white	red	white	red	white	white	white	
	Amperes.....	1.2	1.0	2.6	1.5	2.4	2.8	2.6	3	2.7	2.8	
	Volts.....	4	2	5	6	10	6	11.5	8	12	13.5	
	Lamp resistance in ohms....	3.3	2.0	1.9	4.0	4.2	2.1	4.4	2.7	4.5	4.8	
	Watts per Hefner Candle....	4.8	2.0	2.6	1.8	2.4	1.7	1.9	1.5	1.6	1.5	
	Cells necessary } red....	3		3		6		6				
	for operation } white....		2		4		4		5	7	8	
	Duty Free.....	1.50	1.20	1.50	1.50	1.95	1.95	1.95	1.95	2.25	2.25	
	Duty Paid.....	2.00	1.60	2.00	2.00	2.60	2.60	2.60	2.60	3.00	3.00	
42208.	Precision Mounting for Standard Incandescent Osram lamps.										Duty Free	Duty Paid
42212.	Standard Hefner Lamp, with flame measuring device and sighting arrangement.										6.00	8.00
42216.	" " " as above, with P. T. R. certificate.										12.60	16.80
42220.	" " " as above, with flame measuring device after Kruss.										13.50	18.00
42224.	" " " as above, with P. T. R. certificate.										14.40	19.20

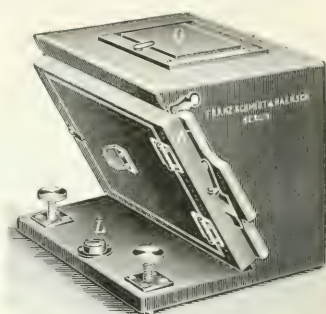




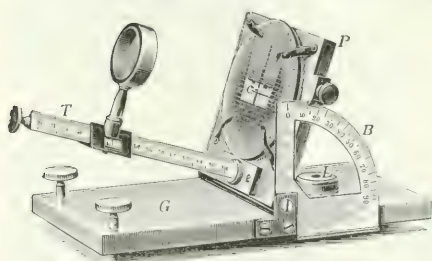
No. 42228



No. 42248



No. 42256



No. 42252



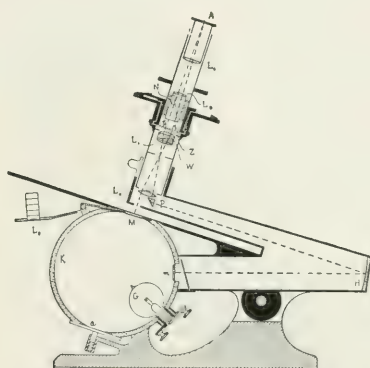
No. 42260

		Duty Free	Duty Paid
42228.	Polarisation Photometer, Martens, for white light on stand as shown in illustration.	89.40	119.20
42232.	" " " " without stand .....	38.40	51.20
42236.	Stand only for above Photometer .....	51.00	68.00
42240.	Case " " " " .....	2.10	2.80
42244.	Comparison Lamp for above; very important for many measurements in fluorescence, etc., consisting of a small Osram lamp for 2 volts, with opal glass screen and mounting for immediate attachment to the Photometer....	22.50	30.00
42248.	Illumination Tester, Thorner, in box as shown in illustration. See <i>Hygienischen Rundschau</i> 1904, Nr. 18. and <i>Gesundheits-Ingenieur, Zeitschrift für die gesamte Städtehygiene</i> , 1908 .....	12.00	16.00
42252.	Raumwinkelmessgerät, Weber, for the measurement of the angle of illumination and elevation angle with which a given area is illuminated.....	24.00	32.00
42256.	Raumwinkelmessgerät, Pleier. ....	28.80	38.40
42260.	Illuminometer, Wingen, for measuring the illumination of a desk, work table, etc., within the limits of 10 and 50 meter candles in steps of 10. See <i>Journ. f. Gasbeleucht.</i> 35, 7-8, 1902 .....	9.30	12.40
42264.	Illuminometer, Wingen, reading in single meter candles up to 50 meter candles and with lamp extended to 500 meter candles by means of smoked glass disc to be inserted. ....	19.50	26.00

Note—Complete descriptive German pamphlet of Schmidt and Haensch describing above Photometers and, in addition, the large Physikalisch-Technische Reichsanstalt model, sent on application.



No. 42268



No. 42272

42268. Densitometer, Martens, for the measurement of the density of photographic plates, etc. This instrument is a specific application of the Polarisation Photometer, with convenient stage for the plates. See *Zeitschrift für wissenschaftliche Photographie, Photophysik und Photochemie, Band VII, Heft 8, 1909.*
- Duty Free..... 78.00 Duty Paid..... 104.00
42272. Densitometer, latest construction, for use with two 10 candle power 4 volts standard lamps, with stage for plates, operating on the same principle as Martens Densitometer
- Duty Free..... 195.00 Duty Paid..... 260.00



View in Salesroom showing samples of Analytical and other Balances, Woulff Bottles, Aspirator Bottles, etc.

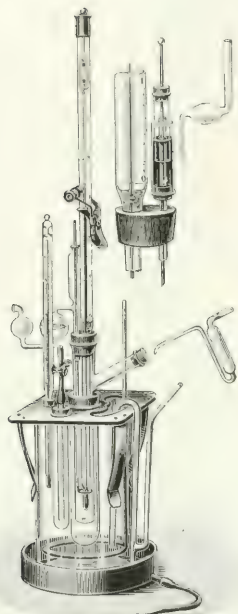
## PHYSICAL-CHEMISTRY APPARATUS

Apparatus for the Determination of Molecular Weight

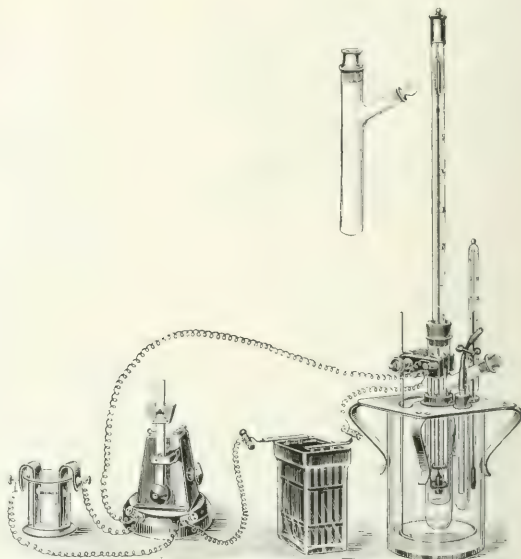
Apparatus for the Determination of the Conductivity of Electrolytes (Dielectric Constant)

Apparatus for the Determination of Electro-Motive Force by the Potentiometer Method

Ostwald Viscosity Outfits, etc., etc.



No. 42300



No. 42308

42300. Molecular Weight Determination Apparatus, Beckmann, by Depression of the Freezing Point. See *Zeitschrift für Physikalische Chemie*, Band II, Seite 638 und Band VII, Seite 323-330. Complete outfit consisting of the following:—

Cooling Jar, with nickel plated cover, stirrer, four air jackets, four freezing tubes with corks, three filling pipettes, one freezing rod and one rubber stopper.

Zinc Trough, with glass syphon to draw off cooling mixture.

Thermometer for the cooling mixture from  $-20$  to  $+40^{\circ}\text{C}$ . in single degrees.

Stirrer, for the solution, of glass with platinum ring (approximately 2.1 grams of platinum).

Sulphuric Acid Tube. When hygroscopic solutions are investigated the stirrer passes through this tube which should then be filled with sulphuric acid and attached to a filter pump with drying cylinders in order to obtain a current of dry air for the determination.

Thermometer, Beckmann Differential, with auxiliary scale, range  $5$  to  $6^{\circ}\text{C}$ . in  $\frac{1}{100}$ ths. (No. 48276.)

Reading Device for Beckmann Thermometer. (No. 48276.)

Duty Free..... 23.00

Duty Paid..... 31.50

42301. Molecular Weight Determination Apparatus, complete as above, but without Beckmann Differential Thermometer.

Duty Free..... 12.10

Duty Paid..... 16.50

42308. Molecular Weight Determination Apparatus, Beckmann, by the Depression of the Freezing Point, for Hygroscopic Solutions, with freezing tube hermetically closed against the moisture of the air and the stirrer operated by electromagnet. See *Zeitschrift für Physikalische Chemie* Band XXI Seite 240 und Band XLIV Seite 169-184. The outfit consists of the following:

Cooling Vessel, with nickel cover, stirrer, four air jackets, four freezing tubes with corks, three filling pipettes, one freezing rod and two rubber stoppers.

Thermometer, for the cooling mixture, from  $-20$  to  $+40^{\circ}\text{C}$ . in single degrees.

Stirrer, of platinum, mounted on enamelled iron ring for operation by electromagnet. Approximately 3.20 grams of platinum.

Electromagnet, for operating stirrer.

Thermometer, Beckmann Differential, with auxiliary scale, range  $5$  to  $6^{\circ}\text{C}$ . in  $\frac{1}{100}$ ths. (No. 48288.)

Accumulator.

Metronome Contact Break, with clock-work running 40 minutes and platinum contact.

Spark Conductor, to suppress the first spark at the metronome break in order to protect the contact.

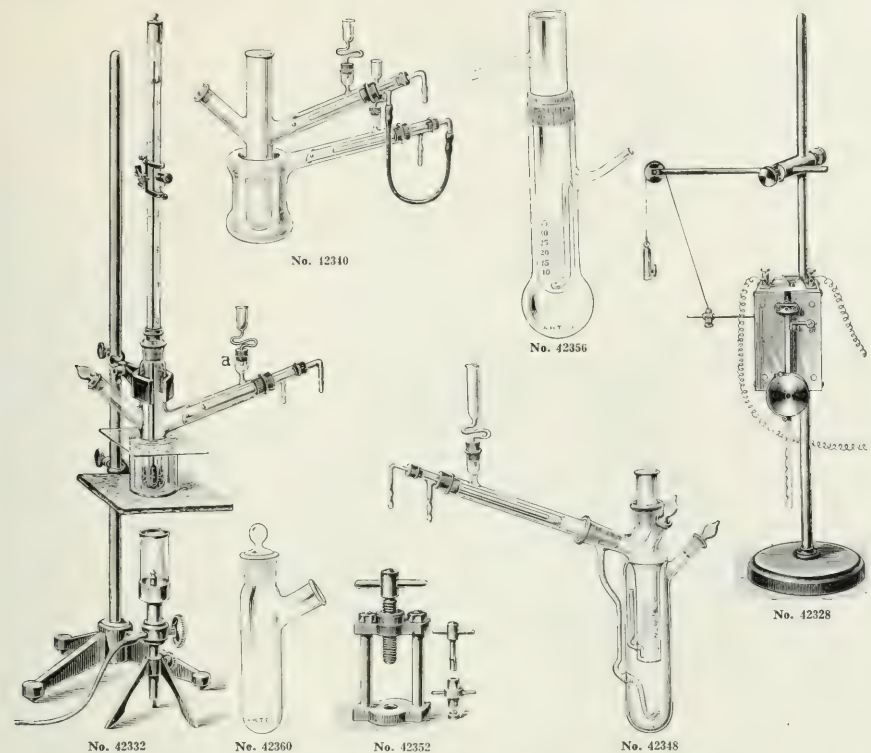
Duty Free..... 33.60

Duty Paid..... 45.80

42312. Molecular Weight Determination Apparatus, outfit complete as above but without Beckmann Differential Thermometer.

Duty Free..... 22.75

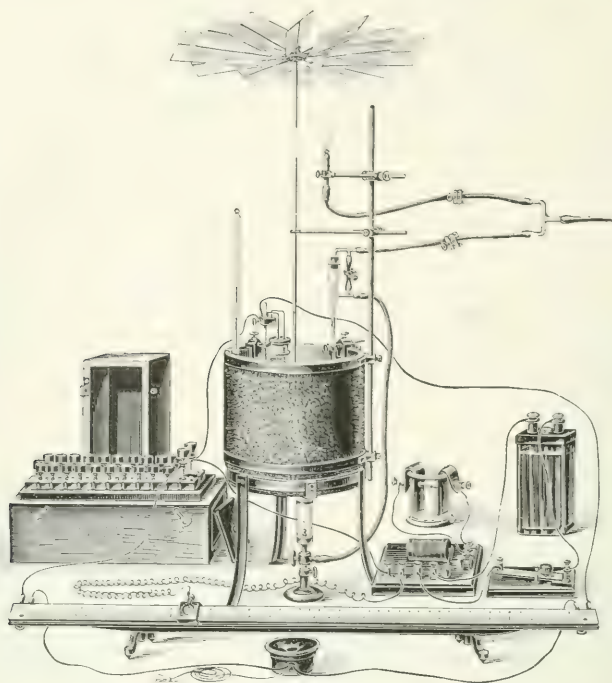
Duty Paid..... 30.95



**Extra Parts and Accessories for the preceding Molecular Weight Determination Apparatus.**

- |        |   |       |                |
|--------|---|-------|----------------|
| 42316. | Freezing Tube as used in outfit No. 42300.  | ..... | .40            |
| 42320. | “ “ with ground stopper and ground in tubulation for thermometer.   | ..... | 1.00           |
| 42324. | Thermometer, for cooling mixture from $-20$ to $+40^{\circ}$ C. in single degrees.  | ..... | 1.25           |
| 42328. | Mechanical Stirrer, with clockwork running two hours; on adjustable stand with contacts so that it may be used as an electromagnetic stirrer as well; pendulum bob is adjustable for different speeds.  | ..... | 15.00          |
| 42332. | Molecular Weight Determination Apparatus, Beckmann, by Elevation of the Boiling Point. See <i>Zeitschrift für Physikalische Chemie</i> Band XXI, Seite 245 und Band XL, Seite 130-144. The outfit consists of the following:  |       |                |
|        | Support, with clamp, ring, etc.   |       |                |
|        | Boiling Tube, of Jena glass, with ground in stopper and tubulation for thermometer (which may be held in place by asbestos paper).  |       |                |
|        | 100 grams Garnets for charging material. Platinum tetrahedrons for charging may be had at market price of platinum, which are not included with the outfit. The best charging mixture consists of from 2 to 3 grams of platinum tetrahedrons and 20 grams of garnets.             |       |                |
|        | Jacketed Tubes with mica cover and asbestos support.  |       |                |
|        | Micro Bunsen Burner, with regulating cock, and mica chimney.  |       |                |
|        | Thermometer, Beckmann Differential, with auxiliary scale, graduated from $5$ to $6^{\circ}$ C. in $\frac{1}{100}$ ths. (No. 48238).   |       |                |
|        | Duty Free.....  | 17.30 | Duty Paid..... |
| 42336. | Molecular Weight Determination Apparatus, outfit complete as above but without Beckmann Differential Thermometer.   |       | 23.60          |
|        | Duty Free.....  | 6.50  | Duty Paid..... |
|        | Extra Parts and Accessories for above Molecular Weight Determination Apparatus.   |       |                |
| 42340. | Boiling Point Tube, Beckmann, of Jena glass, as supplied with outfit No. 42332.   |       | 3.25           |
| 42344. | Steaming Jacket for above when investigating solutions of high boiling point, of glass with condenser inside the arm. See <i>Zeitschrift für Physikalische Chemie</i> Band XL, Seite 137-138.   |       | 2.50           |
| 42348. | Boiling Point Tube, Beckmann, model of 1903. See <i>Zeitschrift für Physikalische Chemie</i> , Band XLIV, Seite 162-168; with two ground in stoppers and two ground in tubulations, with reflux condenser for discharging reflux into the jacket of the boiling tube as required. |       | 7.50           |
| 42352. | Pastille Press, of steel, 5 mm bore.  |       | 7.00           |
| 42356. | Boiling Point Apparatus, McCoy, consisting of a graduated vessel with water jacket. See <i>Journal of the American Chemical Society</i> , April, 1900.  |       | 3.50           |
| 42360. | Boiling Point Apparatus, Jones. A glass vessel with ground in stopper and side tubulation.  |       | 3.00           |





No. 42364

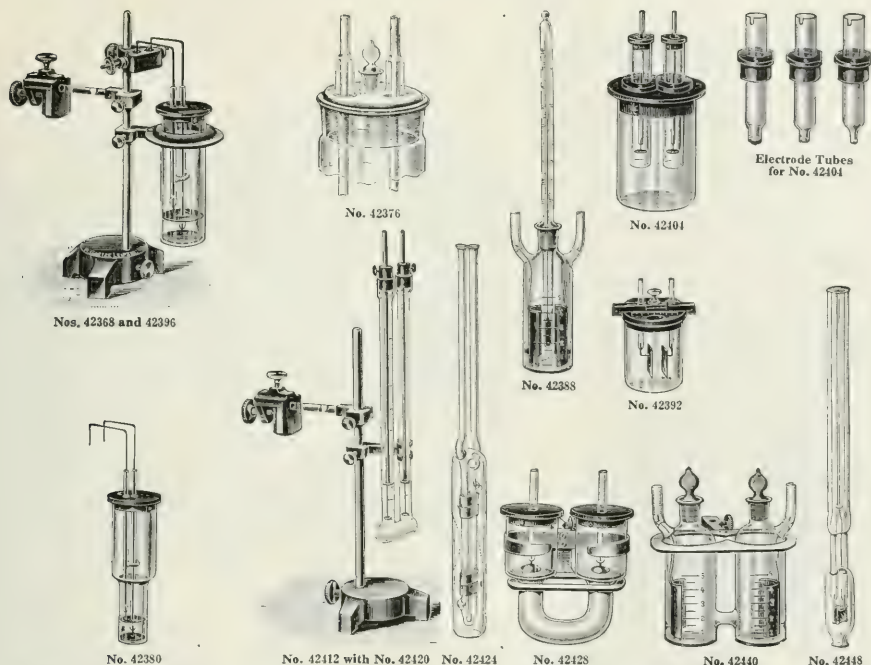
42364. Apparatus for the Determination of the Conductivity of Electrolytes (Dielectric Constant), Kohlrausch-Ostwald, as used in the Leipzig laboratories. See *Phys.-chem. Mess.*, 3 Auflage, Seite 461. Outfit consists of the following:-

Conductivity Vessel, Ostwald, of Jena glass, with electrodes 15 mm diameter; platinum weight approximately 2.2 grams.  
 Constant Temperature Bath, Ostwald, 23 cm diameter and 25 cm high; with felt jacket, micro burner, two toluol regulators with supports and thermometer.  
 Support for conductivity vessels, with removable base and clamp for hanging in thermostat.  
 Thermometer, 0-60° C. in  $\frac{1}{10}$ ths.  
 Induction Coil, simple form, with felt insulation under base.  
 Condenser for use with above induction coil.  
 Storage Battery, without solution, capacity 10 ampere hours.  
 Contact Key, with three binding posts, on polished wood base.  
 Slide Wire Bridge, with scale 1 meter long divided into millimeters, model of the Phys.-chemischen Institute, Leipzig.  
 Telephone, for use with slide wire bridge.  
 Resistance Box, from 0.1 to 500 ohms, with 17 coils, giving a total resistance of 1111.1 ohms, quality A, in accordance with the requirements of the Physikalisch-Technische Reichsanstalt.

Duty Free..... 112.00 Duty Paid..... 152.00

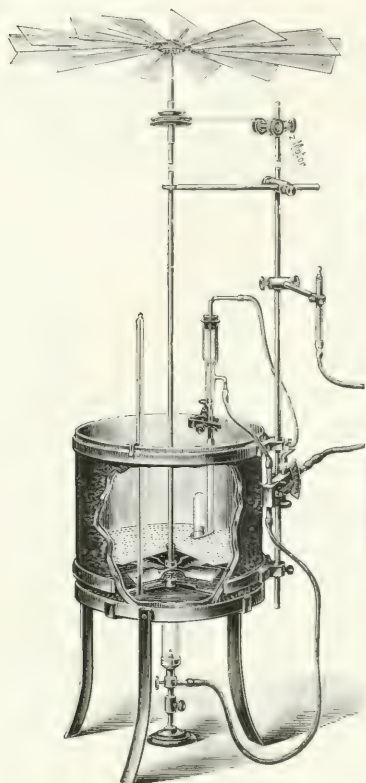
Extra Parts and Accessories for Apparatus for the Determination of the Conductivity of Electrolytes.

		Duty Free	Stock
42368.	Conductivity Cell, Arrhenius, for poor conductors, with electrodes 24 mm in diameter with a separation of 10 mm. Approximately weight of platinum 5.6 grams; with extra cell of Jena glass.....	12.15	18.40
42372.	Extra Cell, only, for above, of Jena glass.....		.40
42376.	Conductivity Cell, Arrhenius, for poor conductors, with electrodes sealed in, ground in glass stopper with stopcock.....	13.25	20.00
42380.	Conductivity Cell, Ostwald, for poor conductors, with electrodes 15 mm in diameter with separation of 20 mm. Approximate weight of platinum 2.2 grams. With extra cell of Jena glass.....	6.10	9.25
	Extra Cell, only, for above, of Jena glass.....		.50
42384.	Conductivity Cell, Ostwald, for poor conductors; with electrodes sealed in and ground in glass stopper with stopcock.....	7.20	10.90
42388.	Conductivity Cell, Kohlrausch, for poor conductors, with large, firmly fixed platinum electrodes. Approximate weight of platinum 4.2 grams. With ground in stopper with thermometer and graduations on cell.....	11.40	17.25
42392.	Conductivity Cell, Kohlrausch-Holborn, for poor conductors, with vertical electrodes with adjustable separation to be measured in millimeters. Approximate platinum weight 4.2 grams. When this cell is used with holder No. 42396 the larger rubber ring No. 42406 is necessary.....	12.80	19.50

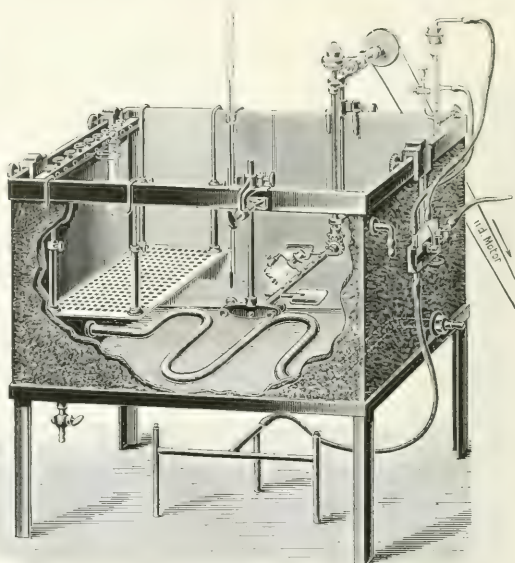


	No. 42380	No. 42412 with No. 42420	No. 42424	No. 42428	No. 42440	No. 42448
42396. Support and Holder, for any of the above cells, with removable base and clamp for fixing to side of constant temperature bath and hard rubber terminals for electrodes with binding screws.					Duty Free	Duty Paid
42400. Large Rubber Ring for above, for use with cells of wide diameter such as No. 42392.					3.10	4.65
42404. Conductivity Cell, Nernst, for good conductors. See <i>Deutsch. Phys. Ges.</i> 1906. 1. With five different glass electrode tubes of variable capacity for insertion through the cover. Glass parts of Jena glass. Platinum weight approximately 2.5 grams. This may be used with support and clamp No. 42396 and large ring No. 42400.						.25
42408. Extra Cell, only, for above, of Jena glass.					12.00	18.00
42412. Conductivity Cell, Kohlrausch, for good conductors. See <i>Kohlrausch-Holborn Leitvermögen der Elektrolyte</i> 1898 Seite 20. With adjustable electrodes set in graduated tubes, each tube graduated in 45 capacities in $\frac{1}{10}$ ths. The platinum electrodes are set in silver rods. Approximate platinum weight 4 grams.						1.00
42416. Extra Cell, only, with graduations but without electrodes.					7.30	11.00
42420. Stand for above Cell, with removable base and with clamp for attaching to side of constant temperature bath.						2.00
42424. Immersion Electrode, for good conductors, in protecting cylinder of glass. Platinum weight approximately 1.3 grams.					3.90	5.90
42428. Conductivity Cell, Kohlrausch, for good conductors, with five extra cells of different capacities, with safety device for electrodes. Approx. platinum weight 4 grams.					12.50	19.00
42432. Extra Glass Cells, each.					.65	1.00
42436. Holder for the above cell similar to No. 42396 with the exception that the clamp is oval as shown in illustration of No. 42428.					3.60	5.40
42440. Conductivity Cell, Kohlrausch, with two glass stoppers and graduations on each arm of cell in $\frac{1}{10}$ cm. Platinum weight approx. 4.2 grams.					10.80	16.40
42444. Holder for the above cell, similar to No. 42396 but with special double rim to take both arms of cell as shown.					3.50	5.25
42448. Immersion Electrode, for poor conductors. Approx. platinum weight 1.2 grams					4.00	6.00

Note—Prices of conductivity cells involving the use of platinum vary according to the market price of platinum.



No. 42452



No. 42456

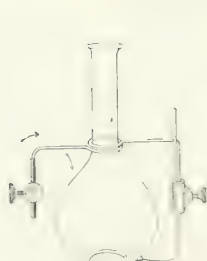
42452. **Constant Temperature Bath, Ostwald**, consisting of enamelled bath with felt cover, tripod, perforated nickel shelf, micro burner and two toluol regulators, but without thermometer as shown in illustration. With necessary clamps and either mica vanes for stirring by flame from the burner or pulley for stirring by motor. Type must be specified in ordering.

Duty Free..... 18.50  
Stock..... 30.00

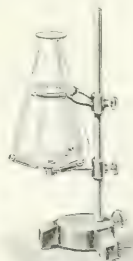
42456. **Constant Temperature Bath, Ostwald**, rectangular form, suitable for a great variety of work in Physical Chemistry. Bath is of tinned copper with outside jacket of felt. Complete with all fittings as shown in illustration with the exception of the thermometer and with two toluol regulators, 55 cm long, 35 cm wide and 35 cm high.

Duty Free..... 55.50

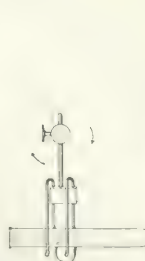
Duty Paid..... 75.60



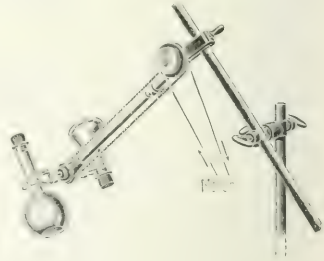
No. 42460



No. 42464



No. 42468



No. 42472

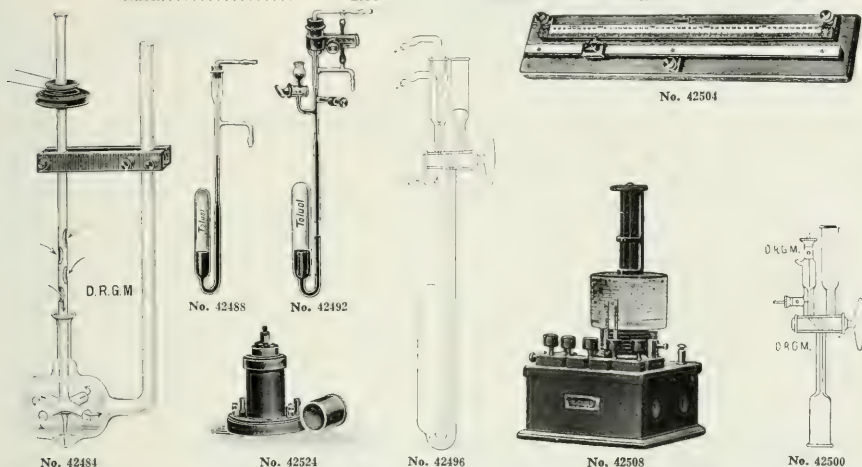
42460. **Flask Holder**, to take small flasks, for use in constant temperature bath..... .75  
42464. " " with removable base. When base is removed holder may be used in constant temperature bath..... 1.75  
42468. **Test Tube Holder**, for use in constant temperature bath..... .60  
42472. **Shaking Device**, for flasks, etc., for use in constant temperature bath. May be attached to any support..... 8.50

42476. **Constant Temperature Bath, Freas, Sensitive Water**, designed to furnish a continuous constant temperature for the range of temperature on the lower limit of the available hydrant water supply and on the upper limit of about 50° C. in a room of ordinary temperature. The extreme accuracy and small variation, which does not exceed .002° makes the thermostat especially suitable for the refined measurements of Physical Chemistry, botanical investigations, exact specific gravity determinations, etc. The apparatus consists of a well insulated tank of 340 liters water capacity, provided with spacious glass windows for observations and perforated shelf on which the experimental work can be placed. The tank is equipped with a stirring device and a mercury regulator which controls the heat through a thermal relay; long cylindrical filament lamps with low thermal capacity and motor suspended on adjustable springs to eliminate vibratory noise and vibration; device for maintaining constant water level and device for cooling the water in the tank when the room temperature is too great. Complete with regulator (without mercury) motor, etc., ready for connection with water supply, drain and current. Further description, price and illustration on application.

42480. **Thermometers, Ostwald**, specially made for use in constant temperature baths, as used in Physical Chemistry, etc. With enclosed milk glass scale.

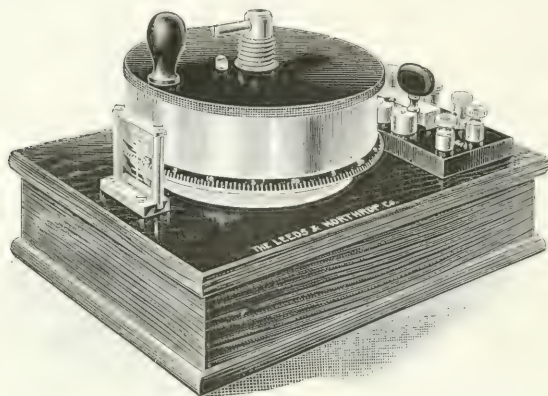
Range..... +10° to +30° C. 0 to +60° C. +50 to +105° C. +100 to +150° C.

Graduated in.....  $\frac{1}{10}$   $\frac{1}{10}$   $\frac{1}{10}$   $\frac{1}{10}$   
Each..... 2.00 2.50 4.00 5.00

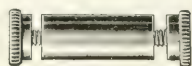


42484. **Stirring Device, Luther**, for operation by suction and for chemically pure solutions and other liquids attacking metal. For use in constant temperature bath..... 8.00
42488. **Toluol Regulator, Ostwald**, simple form, with by-pass, for use with gas regulating valve on Constant Temperature Baths No. 42452 or 42456..... 1.50
42492. **Toluol Regulator, Ostwald**, same as above but with fine adjustment, reservoir and new form of clamp..... 6.00
42496. **Toluol Regulator, Ostwald** new form, with by-pass and stopcock..... 5.00
42500. **Contact Arrangement, Ostwald**, with regulating device as in preceding, to be attached to air, liquid or steam regulators so that the control of the gas may be operated by electricity..... 7.50
42504. **Wheatstone Slide Wire Bridge**, 1000 mm long, with millimeter scale and ohm divisions for direct reading of the resistance in ohms..... 10.00
42508. **Wheatstone Bridge**, cylindrical form, with two scales, one divided in 1000 equal parts and the other in ohms.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 45.00 | Duty Paid..... | 54.00 |
|----------------|-------|----------------|-------|
42512. **Wheatstone Bridge**, same as No. 42508 but with comparison resistances in the base plate of  $\frac{1}{10}$ , 1, 10, 100 and 1000 ohms.
- |                |       |                |        |
|----------------|-------|----------------|--------|
| Duty Free..... | 82.50 | Duty Paid..... | 100.00 |
|----------------|-------|----------------|--------|
42516. **Telephone**, for use with above bridges..... 3.00
42520. **Small Key** " " " "..... 1.50
42524. **Inductium** " " " "..... 12.00
42528. **Set of Pure Resistances, Leeds & Northrup**, with four coils, 1-5000 ohms, 1-10000 ohms and 2-20000 ohms. These coils are wound according to the specifications of the U. S. Bureau of Standards for pure resistances, i.e. resistances without any appreciable capacity or induction effect. See *Bulletin of the U. S. Bureau of Standards*, Vol. 8, p. 495. Bifilar winding gives very good results in coils of 1000 ohms or less, but in electrolytic work errors due to capacity and inductance become appreciable when using coils of higher values wound in that manner. Therefore, it is recommended that, when high resistances are required, this box be used in conjunction with one or the other of those previously listed. Each coil is connected to two small binding posts on the top rubber plate in order to keep the capacity of the connections at a minimum..... 50.00

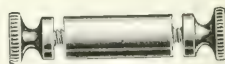




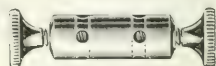
No. 42532



No. 42560A

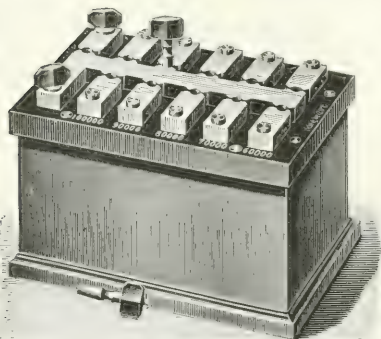


No. 42560B



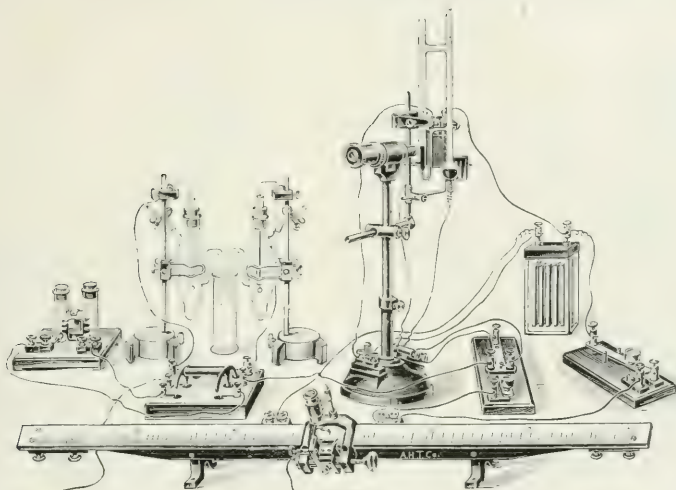
No. 42560C

42532. **Slide Wire Bridge, Kohlrausch, Leeds & Northrup**, with extension coils specially designed for use in the measurement of electrolytic resistances. The slide wire resistance is about 25 ohms and end coils are provided to increase the effective length of the slide wire. These coils are exactly  $4\frac{1}{2}$  times the resistance of the slide wire so that the slide wire is  $\frac{1}{10}$ th of the total resistance. The position of the contact is read by means of the vertical glass scale which reads complete turns and also by the scale on the periphery of the hood, which latter is divided into 100 parts, each division being about 6 mm. These divisions are further subdivided into halves so that it is possible to estimate to  $\frac{1}{1000}$ th of a complete revolution or to  $\frac{1}{10000}$ th of the total motion of the contact point. Used and recommended by many leading Physical Chemists. .... 68.00
42536. **Standard Resistance Box, Leeds & Northrup**, with coils .5, 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000 ohms. An infinity plug is also provided. The coils are arranged on the plug out plan and are guaranteed to be accurate to within  $\frac{1}{1000}$ %. The coils are bifilar wound and are practically free from capacity and inductance, and are particularly recommended for use in the measurement of electrolytic resistances. The wire used is of manganin which has a very low temperature coefficient. The accuracy of the coils is, therefore, practically unaffected by ordinary changes in temperature. The blocks and plugs are large, insuring good plug contacts. .... 85.00
42540. **Standard Resistance Box, Leeds & Northrup**, similar to No. 42536 but containing the following coils; .5, 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000, 2000, 3000, 4000, 10000 ohms, and an infinity plug. .... 100.00
42544. **Induction Coil for Electrolytic Measurements, Leeds & Northrup**, with extreme rigidity of the vibrator so that it will operate in spite of mechanical vibrations and short circuiting of the secondary coil. The vibrator is provided with a slow motion set screw so that fine adjustments are possible. Operates on a single cell of storage battery and is enclosed in a felt lined case, and consequently makes very little noise. .... 20.00
42548. **Head Band Telephone Receiver, Leeds & Northrup**, specially made for laboratory work, unusually sensitive and with strong permanent magnets. The receiver is thoroughly insulated from the head bands which are strong and light in weight. With 6 ft. of flexible cord. .... 5.00



No. 42552

42552. **Resistance Box, Otto Wolff**, in decades with plug connection. Decades 10 x 1000 with a total resistance of 100,000 ohms. Of manganin wire.  
Duty Free ..... 49.50  
Duty Paid ..... 66.00
42556. **Platinizing Solution**, according to Kohlrausch and Holborn, consisting of a 3% solution of platonic chloride and  $\frac{1}{10}$ th of 1% solution of lead acetate. In 50 cc bottles, per bottle. .... 2.50
42560. **Binding Posts, Ostwald**. Sheet or wire can be held equally tight.
- | Style..... | A   | B   | C   |
|------------|-----|-----|-----|
| Each ..... | .35 | .35 | .35 |



No. 42564

42564. Apparatus for the Determination of Electro-motive Force by the Potentiometer Method, arranged according to Ostwald and as used in the Leipzig laboratories. See *Phy.-chem. Mess.*, 3, *Aufgabe*, Seite 426. Outfit consists of the following:—

Capillary Electrometer with microscope of 30 and 60 diameters and ocular micrometer divided into  $\frac{1}{10}$  mm, with movable mirror and horizontal fine adjustment on the microscope.

Electrometer Key, with platinum contact, on wooden base. See *Phys.-chem. Mess.* 398.

Cadmium Normal Element, mounted on board, with binding posts.

Slide Wire Bridge, with scale 1 meter long divided into millimeters, model of the Phys.-Chemischen Institute, Leipzig.

Accumulator.

Contact Key for one circuit, with three posts, on polished wooden base.

1 pair of Half Elements No. 42625 with Cylinder No. 42632, Stand and Clamp No. 42636 and with two each of No. 42640

Electrodes.

Mercury Commutator with six binding posts.

Duty Free..... 46.75

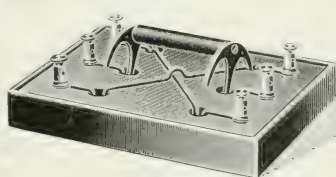
Duty Paid..... 63.75



No. 42568



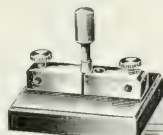
No. 42572



No. 42580



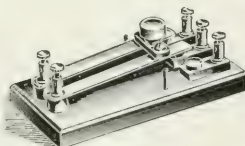
No. 42576



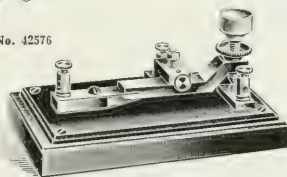
No. 42592



No. 42592



No. 42588



No. 42600

42568. Capillary Electrometer, with microscope of 30 and 60 diameters and ocular micrometer divided into  $\frac{1}{10}$  mm, with movable mirror and horizontal fine adjustment on the microscope. Illustration shows Tube No. 42576 in position. .... 25.00

42572. Capillary Electrometer Tube, Ostwald, vertical form. .... .30

42576. " " Luther, with contacts and already filled. .... 3.00

42580. Mercury Commutator, with six binding posts. .... 4.00

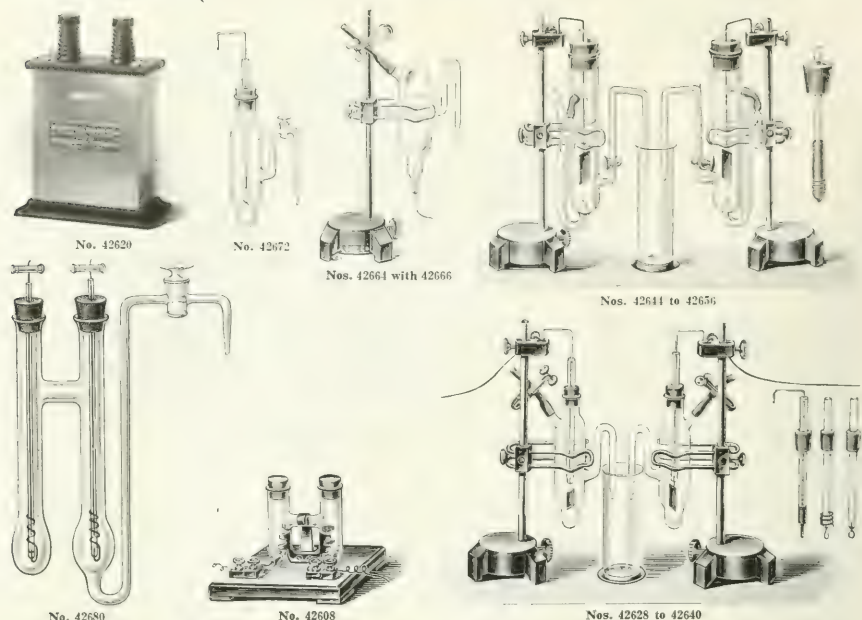
42584. Contact Key, for one circuit, with three posts, on polished wooden base. As shown on right hand side of outfit No. 42564. .... 2.25

42588. Contact Key, for two circuits, with five binding posts. .... 4.25

42592. " " du Bois-Reymond, on wooden base. .... 4.25

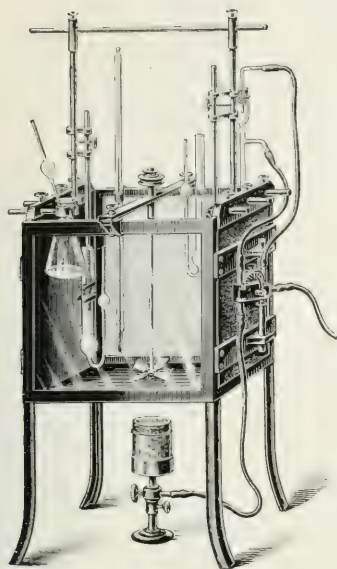
42596. Plug Key, on polished wooden base. .... 2.75

42600. Electrometer Key, with adjustable contact screw on spring, mounted on hard rubber. .... 6.75



42604. Cadmium Normal Element, Drucker, with two platinum contacts, in protecting tube, with two corks, without any support and to be filled by user. See *Phys.-Chem. Mess.* 419..... 1.25
42608. Cadmium Normal Element, on board, with binding posts and clamp to hold glass vessel in position 3.25
42612. Battery of Five Cadmium Normal Elements, mounted on board as in No. 42608, with binding posts, clamps, etc. .... 14.85
42616. Chemically Pure Material and solution for filling above elements as the cells can not be sent out filled. **Duty Paid.**..... 20.25
- In air-tight glass containers. To fill, elements ..... 1.75 3.00 5.00
42620. Weston Standard Cell, Unsaturated Form, Model 4. At ordinary working temperature (15° to 35° C) change in E.M.F. is so small as to be negligible in most work. The E.M.F. is about 1.0187 volts at 20° C. Each cell is accompanied by a certificate giving the exact E.M.F. and other necessary data ..... 17.50
42624. Weston Standard Cell, as above, with National Bureau of Standards certificate. .... 17.50
42628. Glass Cells for Half Elements, with syphon and tubulation with rubber tubing and pinchcock. **Per pair.**..... .80
42632. Cylinder for connecting the two half elements. .... .15
42636. Supports, with element holder, mercury contact and binding posts. **Per pair.**..... 4.50
42640. Metal Electrodes, mounted in glass tubes with rubber stopper to fit above glass cells.
- | Metal.    | Platinum Foil | Platinum Ring | Silver Spiral | Gold Foil | Zinc Rod | Copper Rod |
|-----------|---------------|---------------|---------------|-----------|----------|------------|
| Each..... | 2.00          | .75           | .75           | 1.75      | .50      | .50        |
42644. Glass Cells for Gas Electrodes, Ostwald, with syphon and glass stopcock. **Per pair.**..... 3.00
42648. Cylinder for connecting the two elements. .... .15
42652. Supports, with element holder, mercury contact and binding posts. **Per pair.**..... 4.50
42656. Electrodes, on glass tube, with rubber stopper, of platinum foil. Approximate platinum weight 1.2 grams. **Per pair.**..... 5.50
42660. Platinum Electrodes, Luther, with internal contact. **Per pair.**..... 2.25
42664. Glass Cell, Drucker, for Calomel Normal Electrode, with fused in platinum wire, syphon and tubulation with rubber tubing and pinchcock. **Each.**..... .90
42666. Support, for above, with clamp and detachable base. .... 1.75
42668. Glass Cell, Drucker, as above but with glass stopcock in syphon, as shown in illustration of No. 42672 ..... 1.75
42672. Glass Cell, Drucker, as above but with electrical connection from above and with glass stopcock in syphon ..... 1.75
42680. Migration Tube, with silver and copper electrode. .... 3.50

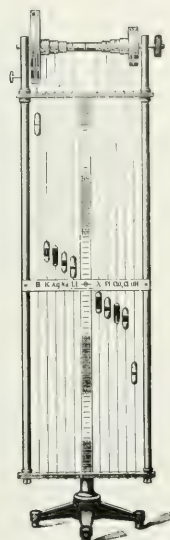




No. 42684



No. 42696



No. 42700

42684. Outfit for the Determination of Viscosity, Ostwald, consisting of rectangular constant temperature bath with two glass sides and with support for two viscosity tubes. With stirring device, three capillary tubes from 80 to 100 seconds outflow time, two toluol regulators, with clamp, micro burner, small flask, pipette and a thermometer holder.  
Duty Free..... 22.50      Duty Paid..... 30.75
42688. Viscosity Tube, only, as furnished with above outfit, from 80 to 100 seconds outflow time when not otherwise specified..... .75
42692. Viscosity Tubes, in sets of six, with varying times of outflow from 20 to 250 seconds. Per set... 3.75
42696. Viscosity Tube, Drucker, new form, with glass stopcock. Time of outflow 80 to 100 seconds unless otherwise specified..... 4.00

42700. Model for Lecture Table Demonstrations of the Migration of Ions, Kohlrausch. See *Zeitschrift für physikalische Chemie*, XXXIV, 5, 1900.  
Duty Free..... 16.50      Duty Paid..... 22.00

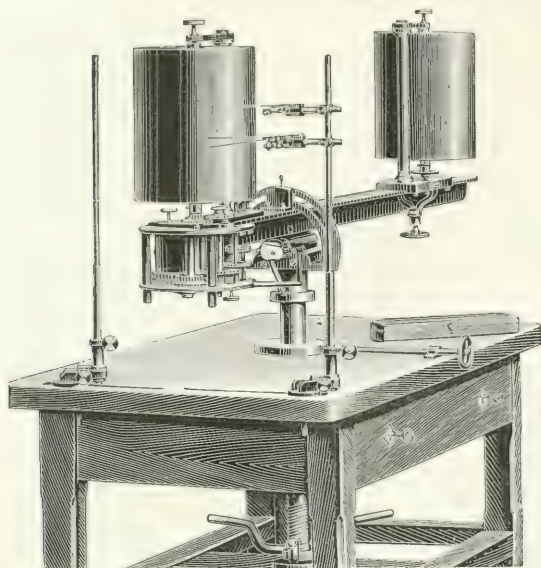
In the preceding section on Physical Chemistry and in the following section on Physiological Apparatus no effort has been made to list all of the apparatus offered by the leading European manufacturers. In the section on Physical Chemistry we have selected typical apparatus for routine and teaching work in the most important subjects under this heading.

In the section on Physiological and Clinical Apparatus the apparatus has been selected with special reference to laboratories of Experimental Pathology, Experimental and Clinical Medicine, Pharmacology and Experimental Therapeutics. We have made no attempt to list a complete section of apparatus for both teaching and research in Physiology as such.

We keep on hand a supply of European manufacturers' catalogues covering very completely the latest developments in apparatus for both Physical Chemistry and Physiology and these catalogues are sent to customers where wider choice of apparatus seems advisable.



## PHYSIOLOGICAL AND CLINICAL APPARATUS



No. 42800

**42800. Kymograph, Hürthle,** mounted on heavy oak table, with two cylinders of 20 cm diameter and 25 cm high adjustable as to distance apart so that papers of from 60 to 330 cm in length can be used. With new reducing gear so that speeds can be obtained from 0.2 to 120 cm per second. As supplied by us to Rockefeller Institute for Medical Research, Harvard University, University of Wisconsin, University of Pennsylvania, University of California, Drs. Mayo, Graham, Plummer & Judd, U. S. Public Health & Marine Hospital Service, etc.

Duty Free..... 282.00

Duty Paid..... 338.40

**42804. Apparatus for smoking paper** with gas flame, after Hürthle.

Duty Free..... 25.50

Duty Paid..... 30.60

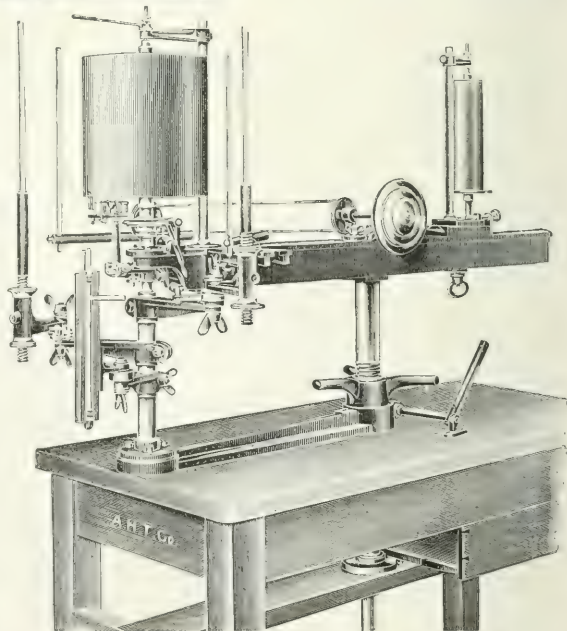
**42808. Special glazed paper,** 50 cm wide, in rolls of 10 meters. Per roll, from stock..... 1.00

**42812. Kymograph, Brodie,** mounted on strong table with top 51x24 inches. The recording drum is 9 inches in diameter and 10 inches high and will take papers of varying length from 6 ft. 3 in. to 9 ft. 6 in. A fine adjustment is provided on the small drum for tightening the paper. The time marker and signal are conveniently placed under the drum so as not to interfere with the manometer. Price includes separate pair of drums for smoking and varnishing, mounted on wall brackets. A recent improvement is a two speed gear so that the speed may, at any moment, be increased from  $1\frac{1}{2}$  to 24 times.

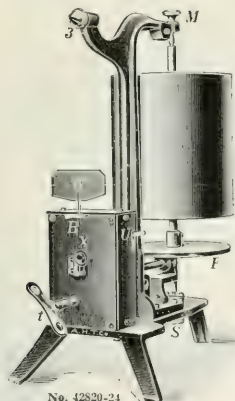
Duty Free..... 330.00

Duty Paid..... 400.00

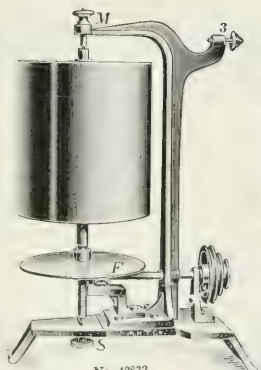
**42816. Special glazed paper,** 10 inches wide, in rolls of 200 yards, Per roll..... 4.00



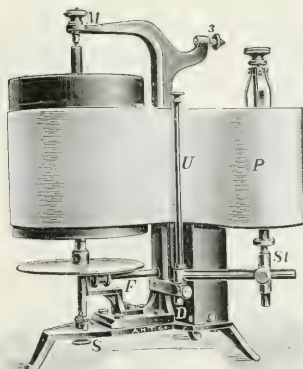
No. 42812



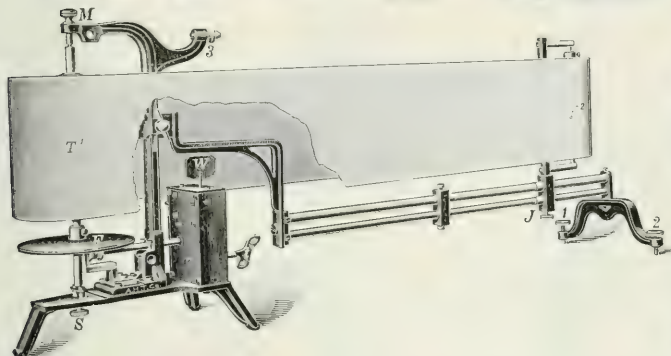
No. 42820-24



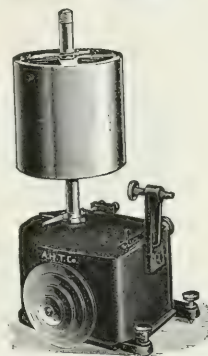
No. 42832



No. 42844



No. 42848



No. 42860

**KYMOGRAPH, ZUNTZ**, for practical class work in the laboratory. The drum is 18 cm high and is immediately detachable for the purpose of attaching the paper which may be readily smoked on the drum with the apparatus in the horizontal position. With variable speeds as noted in the descriptions below.

42820.	Kymograph, as above, with clock-work, for use either vertically or horizontally, surface speed of cylinder varying from 5 to 40 mm per second. By the use of the fan governor No. 42840 the speed may be reduced to one revolution per hour equal to a surface speed of 500 mm per hour.	Duty Free	30.00	Duty Paid	36.00
42824.	Kymograph, as above, but with Fühner's slow motion modification consisting of a supplementary lever by the use of which the speed may be reduced to one rotation in 24 hours. In addition to this slow motion the instrument will give all the speeds attainable with No. 42820.	Duty Free	43.50	Duty Paid	52.25
42828.	Kymograph, same as No. 42820 but with a special quick motion providing a surface speed of 200 mm per second, in addition to the regular speeds of No. 42820.	Duty Free	40.50	Duty Paid	48.60
42832.	Kymograph, same as 42820, but without clock-work, with pulley wheel for driving by independent motor.		21.00		25.20
42836.	Support, Adjustable, for kymographs listed above (see St of No. 42844). This support provides a convenient means of attaching the writing levers, etc.		4.50		5.40
42840.	Fan Governors, for above kymographs in three sizes, each		.90		1.10
42844.	Attachment for Supporting a Continuous Ink Record. Price does not include adjustable support No. 42836 which must be added.		7.50		9.00
42848.	Support, Extension, for use with endless papers by the Hering method.		18.00		21.60
42852.	Carrying Case, with handle and lock.		7.50		9.00
42856.	Glazed Paper, 510 x 180 mm, gummed. Per 100 sheets.		1.15		1.35
42860.	Recording Drum, Sherrington-Starling, with drum 6 x 6 inches adjustable up and down the shaft. Two electric contact springs are provided by which contact at any two points in the revolution can be made. There are two driving gears within the base, a worm and wheel for the slow motion and a volute gear for the fast, with friction-clutch for stopping and starting. A change speed gear permits a range of speeds from 1 to 870 revolutions in a given time depending on the speed of the driving motor. Without driving motor.	Duty Free	35.25	Duty Paid	42.30
42864.	Recording Drum, as above, with screw lifting device.	Duty Free	38.25	Duty Paid	45.90
42868.	Extra Cylinder, 12 inches in diameter.		18.00		21.60
42872.	Glazed Paper, per roll of 200 yards.		2.25		2.70

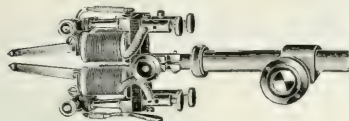




No. 42921



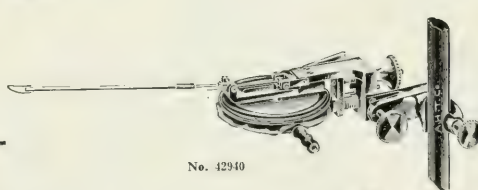
No. 42928



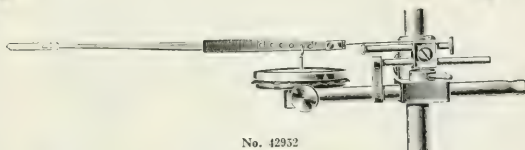
No. 42932



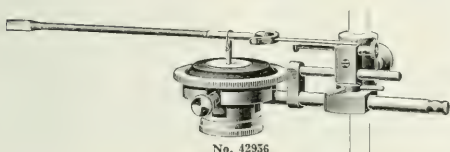
No. 42945



No. 42940



No. 42952



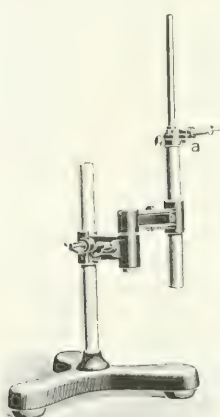
No. 42956



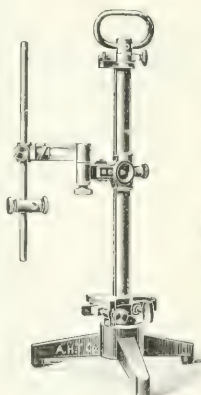
No. 42960

		Duty Free	Duty Paid
42924.	Signal Marker, electric, simple model.....	3.75	4.50
42928.	“ “ Deprez electric, for registering very small time intervals, with fine adjustment of writing point, rack and pinion adjustment for length, etc.....	24.00	28.80
42932.	Signal Marker, same as No. 42928 but with two writing points.....	42.00	50.40
42936.	“ “ electric, with the armature of the magnet controlled by a spring adjustable from 50 vibrations per second to 250, by means of a screw.....	27.50	35.75
42940.	Tambour, Marey, with fine adjustment and double transmission for the writing lever.....	9.00	10.80
42944.	Tambour, Marey, 5 cm in diameter.....	4.20	5.00
42948.	“ “ “ with fine adjustment of the writing point.....	4.80	5.75
42952.	“ “ 3 cm, with rubber membrane held in place by a clamped ring, with adjustment for changing fulcrum of writing lever in order to adjust capsule to the atmospheric pressure.....	13.25	17.25
42956.	Tambour, Marey, Straub's modification, with adjustment for the membrane by means of milled head, which can be carried on while experiment is in progress. Membrane is clamped in position by metal ring as in No. 42952 and apparatus is also furnished with air valve.....	24.25	30.85
42960.	Support, Adjustable, for physiological work, with vertical rod 10 mm diameter, 30 cm high, with fine adjustment on the vertical axis.....	14.50	17.25

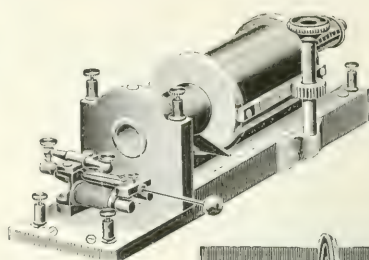




No. 42964



No. 42968



No. 42972



No. 42992



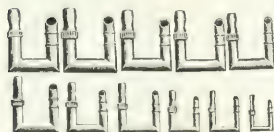
No. 42996



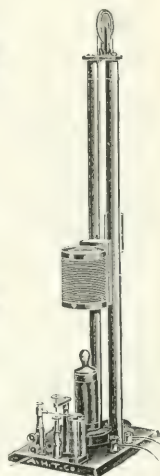
No. 43000



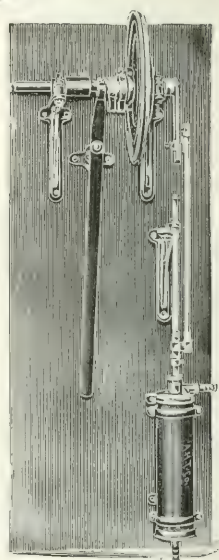
No. 43008



No. 43012

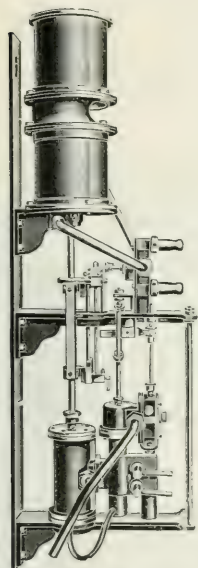


No. 42980

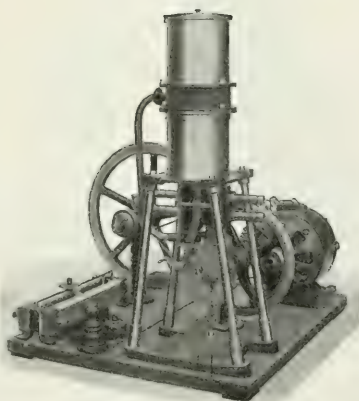


No. 43016

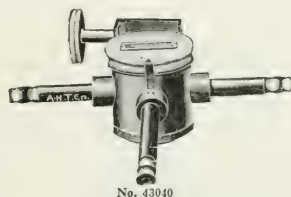
		Duty Free	Duty Paid
42964.	Support, Adjustable, for holding tambours, etc., in contact with the drum, with fine adjustment at "A".....	18.75	24.40
42968.	Support, Large Universal, for physiological use with all adjustments, 55 cm high.....	31.50	37.80
42972.	Inductorium, Du Bois-Reymond, for physiological work, with Meyer's interrupter and scale with which to read the position of the secondary coil, with 5,000 turns of wire.....	18.00	21.60
42976.	Inductorium, same as above, but with 10,000 turns of wire.....	21.00	25.20
42980.	" Vertical Form, secondary being carried by pulley over bars, with counterpoise. With 5,000 turns of wire.....	36.00	43.20
42984.	Inductorium, same as above, but with 10,000 turns of wire.....	40.50	48.60
42986.	Electrodes, Fleisch, unpolarizable. Per pair.....	1.35	1.75
42988.	" Ludwig, for deep seated nerves, in hard rubber mounting. Per set..	6.75	8.00
42992.	Contact Key, Du Bois-Reymond, on heavy base.....	4.00	5.20
42996.	Commutator, Pohl.....	3.75	4.90
43000.	Canulae, of glass for arteries, with bore of from 2 to 8 mm, in sets of 20 pieces. Per set.....	1.05	1.50
43004.	Canulae, of metal, for arteries, with bore of from 2 to 4 mm in sets of 6 pieces. Per set.....	2.40	3.25
43008.	Canulae, of metal, for the trachia. State diameter in ordering. These canulae rotate and are provided with opening for control of expired air. Each.....	2.25	2.70
43012.	Canulae, same as above, in set of 11 from 2 to 12 mm diameter in steps of 1 mm. Per set.....	22.50	27.00
43016.	Respiration Pump, Brodie, with barrel 3 inches in diameter x 11 inches long. By a simple adjustment of the crank the throw of the piston may be quickly altered to deliver any quantity up to 1 liter of air per thrust. The valves are of simple construction and easily reached for examination. Mounted on a board for fixation on the wall of the laboratory.....	57.00	68.40



No. 43020



No. 43028



No. 43040



No. 43048

43020. Artificial Respiration Apparatus, Meyer. See *Archiv. f. exp. Path. u. Pharmacologie* Bd. 47, pag 426. Adjustable from 20 respirations of 1000 cc of air per minute to 100 respirations of 25 cc. With water motor for pressure of at least 30 lbs. ....
43024. Artificial Respiration Apparatus, same as No. 43020 but for water pressure of from 15 to 30 lbs. ....
43028. Artificial Respiration Apparatus, same as No. 43020 but with electric motor. State voltage and current in ordering. ....
43032. Artificial Respiration Apparatus, same as No. 43020 but with small cylinders delivering from 0 to 350 cc of air per thrust. ....
43036. Anaesthetizing Valve, Meyer, with stopcock, for use in connection with artificial respiration apparatus to obtain proper mixture of air and anaesthetic. For small animals. ....

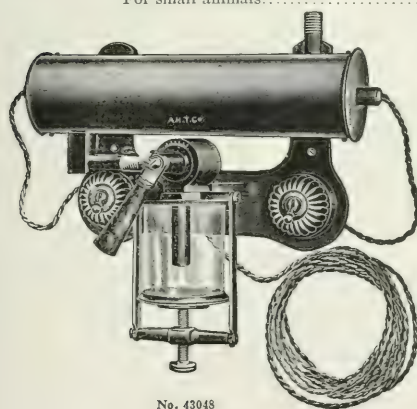
Duty Free	Duty Paid
165.00	200.00
185.00	225.00
175.00	210.00
150.00	180.00
10.80	13.00
13.50	16.25
9.00	11.75

43040. Anaesthetizing Valve, same as above but for large dogs. ....

43044. Respiration Valve, after Metzner. ....

43048. Anaesthetic Bottle and Air Warmer, Brodie, for use in connection with the above Respiration Pump No. 43016 and can be furnished with Dr. Brodie's animal operating table No. 20244. The heater consists of a brass tube with removable ends, holding two ordinary electric light bulbs, each with separate switch. It is advisable to have lamps of different candle-power such as 8 or 16. which may be used singly or together in accordance with the amount of air and degree of heat required. The illustration shows the form as regularly supplied for attaching to the end of Dr. Brodie's operating table, but it is also furnished at same price mounted separately, where a more portable apparatus is required. In ordering please state voltage and whether table or portable form is desired. Complete with one extra glass anaesthesia bottle.

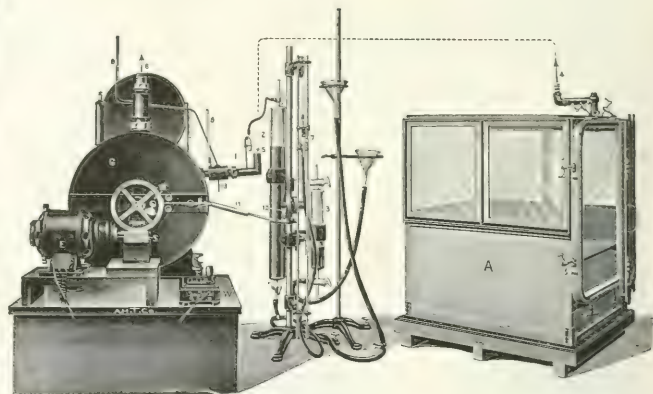
Duty Free	25.20
Duty Paid	30.25



No. 43048



No. 43052

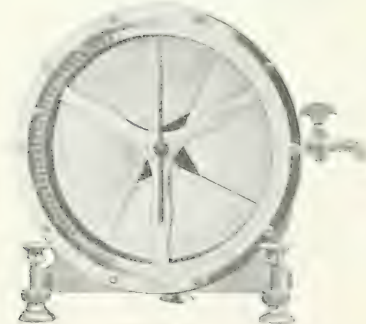


No. 43056

43052. **Spirometer, Jaquet**, for the investigation of the products of respiration. The analysis of the air from the Spirometer is best conducted by the exact method of Petersen and Palmquist (See No. 29388). See Prof. Jaquet—"Über die Nachwirkung einer anstrengenden Muskelarbeit auf den Stoffwechsel." *Archiv für experimentelle Pathologie und Pharmakologie*. Bd. 62, pag. 341; and Gigon—"Über einige Fragen des Stoffwechsels und der Ernährung." *Münchner Mediz. Wochenschrift* Nr. 25. 1911.
- Duty Free..... 200.00      Duty Paid..... 260.00
43056. **Respiration Apparatus, Jaquet**, for the convenient securing and the accurate measurement of the products of respiration, consisting of a large ventilating chamber constructed to order of any size for animals, children or adults. This illustration shows an instrument furnished the Pediatric Clinic at Strassburg with the respiration chamber of sufficient size for small children. The chamber is connected as shown by dotted lines to the large gas meter "G" which is driven by an electric motor. With a controlling rheostat the speed of the motor is changed to vary the ventilation of the chamber. The determination of the oxygen and carbon dioxide content of the tested air with the total volume passing through the meter makes it possible to estimate the total oxygen requirement as well as the carbon dioxide output of the individual under experiment. Price, depending upon the size of the respiration chamber, on application.

#### References.

- Jaquet—*Ein neuer Apparat zur Untersuchung des respiratorischen Stoffwechsels des Menschen*. Verhandl. d. Naturforschenden Gesellschaft Basel 1903. B. 15, p. 252.
- Stähelin—*Zum Energiehaushalt bei der Lungentuberkulose*. Verhandl. des XXIV. Kongr. für innere Medizin. Wiesbaden 1907.
- Stähelin—*Der respiratorische Stoffwechsel eines Fettsüchtigen*, Zeitschrift für klinische Medizin. Bd. LXV.
- Gigon—*Über die Bedeutung der Gewürze in der Ernährung (nach Respirationsversuchen)*. Verhandlung des XXIX deutschen Kongresses für innere Medizin Wiesbaden.
- Falta, Grote, Stähelin—*Versuche über Kraft- und Stoffwechsel u. s. w.* Hofmeisters Beiträge zur chemischen Physiologie und Pathologie 9.



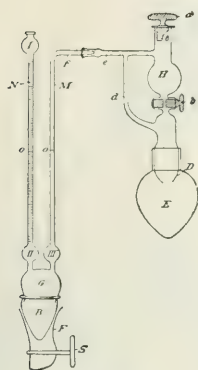
No. 43060

43060. **Gas Meter, Experimental, Bohr**, original Danish make, as widely used in physiological work in connection with respiration and nutrition experiments, etc. With level and regulating screw.

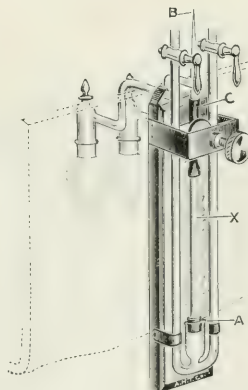
Capacity, liters       $\frac{1}{2}$        $\frac{1}{2}$       1      5      10

Duty Free..... 28.00 38.00 44.00 50.00 60.00

Duty Paid..... 35.00 47.50 55.00 62.50 75.00



No. 43064

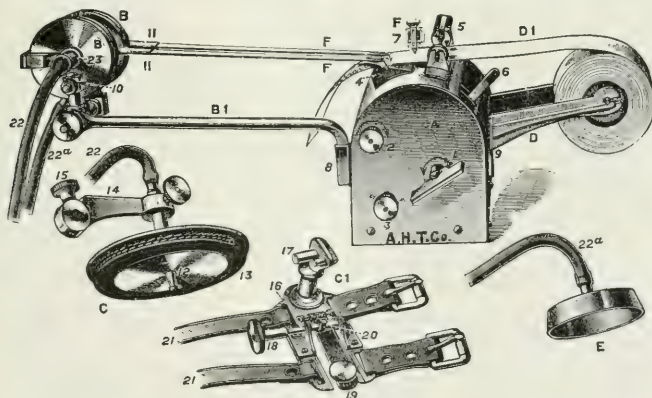


No. 43068



No. 43072

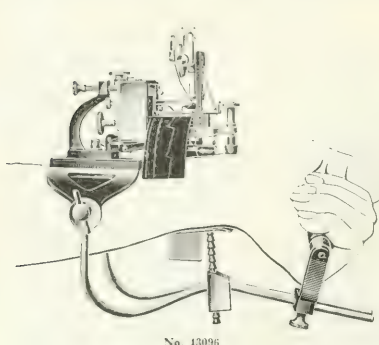
43064. Apparatus, Barcroft and Haldane, for Determining the Oxygen Capacity and Carbonic Acid Content of the Blood by the ferricyanide method modified by Plesch. See *J. Plesch. Haemodynamische Studien, Berlin 1909. Hirschwald and J. Plesch. Die Bestimmung des Schlagvolumens. D. Med. Wochenschrift 1909. No. 6.*  
 Duty Free..... 7.80      Duty Paid..... 11.50
43068. Apparatus, Barcroft and Roberts, for Determining the Differential Pressure of Blood Gases. See *Journal of Physiology XLII, p. 512.*  
 Duty Free..... 9.00      Duty Paid..... 13.20
43072. Apparatus for Determining the Differential Pressure of Blood Gases for the use of very small quantities of blood, i. e.  $\frac{1}{10}$  cc. As used in the systematic determination of the haemoglobin worth or dissociation curves of human beings.  
 Duty Free..... 3.25      Duty Paid..... 4.75



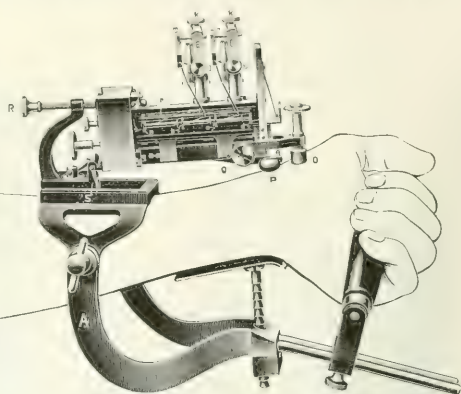
No. 43076

- MACKENZIE INK POLYGRAPH, English make. This instrument records two simultaneous tracings only, i. e. radial pulse and one other, such as carotid, jugular, apex beat, etc., the great advantage being the avoidance of smoked paper and the convenience and permanency of the ink tracings which may be continued almost to any length from the long roll of paper supplied with the instrument. The instrument is not attached to the patient's wrist and by many is preferred because of this feature. The clock work operates at variable speeds permitting the taking of protracted records at different speeds.
43076. Mackenzie Ink Polygraph including a wrist cuff with tambour for the radial pulse, metallic receiving capsules, two sets of pens, one dozen rolls of paper, bottle of ink, brush for loading pens and necessary rubber tubes for connection.  
 Duty Free..... 65.00      Stock..... 84.00
43080. Extra Paper Rolls, per dozen..... .80
43084. Extra Writing or Time Marker Pens. In ordering please state length of pen desired. Each .60

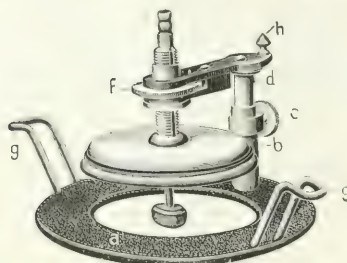




No. 43096



No. 43104



No. 43108



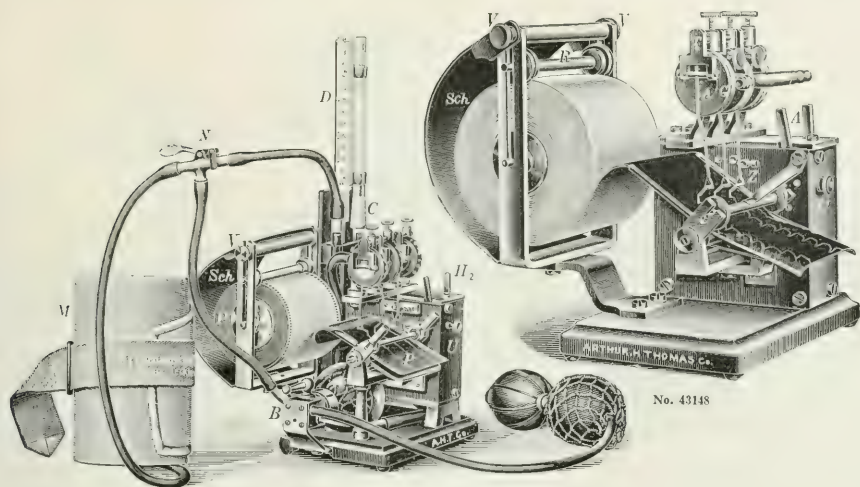
No. 43112

**JAQUET SPHYGMOCARDIOGRAPH.** In these instruments one tracing must always be that from the radial artery, over which the instrument is fixed in place, either by means of a cuff as in the older forms, or by means of the arm rest No. 43136 as shown in above illustrations. In the single tambour type, therefore, two simultaneous tracings are made in addition to the chronograph record, i. e. the radial pulse from the pelotte attached to the instrument and one other tracing through the single tambour and which may be taken from the jugular, carotid, apex beat, respiratory movements, etc. In the double tambour type two tracings may be made simultaneously in addition to that from the radial pulse and the chronograph record. The double tambour type is the most widely used form of Jaquet instrument. Both types are provided with two speeds so that tracings may be greatly magnified by the use of a high speed.

43092.	Jaquet Sphygmocardiograph, Single Tambour type, with cuff for attaching to wrist and 100 glazed paper recording strips, but without arm rest, cardiograph attachment or receiving tambour.	Duty Free	55.00	Duty Paid	71.50
43096.	Jaquet Sphygmocardiograph, Single Tambour type, with arm rest No. 43136, cardiograph attachment for apex beat No. 43108, receiving tambour, 30 mm in diameter, for jugular, carotid, etc., cylinder for smoking papers No. 43132, 100 paper recording strips and bath for fixing records in varnish No. 43128.	Duty Free	84.65	Duty Paid	110.00
43100.	Jaquet Sphygmocardiograph, Double Tambour type (the most widely used form) with cuff to attach to wrist and 100 paper recording strips, but without arm rest, cardiograph attachment or receiving tambour.	Duty Free	76.00	Duty Paid	100.00
43104.	Jaquet Sphygmocardiograph, Double Tambour type, with arm rest No. 43136, cardiograph attachment for apex beat No. 43108, receiving tambour, 30 mm in diameter, for jugular, carotid, etc., No. 43120, cylinder for smoking paper No. 43132, bath for fixing records in varnish No. 43128 and 100 paper recording strips.	Duty Free	105.75	Duty Paid	137.50

**Accessories.**

		Duty Free	Stock
43108.	Cardiograph Attachment only for taking apex beat, with girdle, etc.	13.75	18.00
43112.	Pneumograph after Marey for taking respiratory movements.	17.50	22.75
43116.	Glycerine Pelotte for taking tracings from any superficially located arteries and as particularly recommended for use on children.	6.25	8.15
43120.	Receiving Tambour for jugular, etc., 30 mm in diameter.	1.15	1.50
43124.	" " of special shape for the liver.	1.65	2.25
43128.	Bath for varnishing the tracings.	1.25	1.75
43132.	Cylinder for smoking papers.	3.00	4.00
43136.	Arm Rest new model as shown in illustrations.	10.50	13.75
43140.	Glazed Paper Recording Strips for single tambour instrument per 100 strips.	.40	.50
43144.	Glazed Paper Recording Strips for double tambour instrument per 100 strips.	1.00	1.30



No. 43156

No. 43148

**PORTABLE POLYGRAPH**, with continuous roll (20 meters) of smoked paper. This instrument consists of an accurate clock movement imparting two speeds to the paper, a time marker recording in  $\frac{1}{10}$  seconds and three recording tambours, each of which may receive impulses from three different parts of the body for simultaneous tracing. The instrument thus answers the purpose of a kymograph and is valuable for many purposes because of its extreme portability. The same instrument is furnished with a mercurial sphygmomanometer (No. 43156) indicating blood pressure and a cuff writing attachment. In this arrangement of the instrument one of the tambours must of necessity be used for recording the tracings of the brachial pulse under various pressures, while the other two tambours may be used to record any other two tracings such as the radial, jugular or carotid pulse, apex beat, respiratory movements, etc., under an accurately determinable blood pressure as is read in a manometer. The pressure applied to the cuff is transmitted to the manometer, and at the same time, to the writing tambour by means of a rubber bulb enclosed within a glass bulb; or Erlanger capsule.

43148. **Portable Polygraph**, with three tambours, continuous roll attachment and one roll of prepared smoked paper strips 20 meters long, in polished wood case, but without other attachments.

Duty Free..... 65.75

Duty Paid..... 85.00

43152. **Portable Polygraph**, as above, with Sphygmograph No. 43164 for taking radial pulse, Cardiograph No. 43168 for taking apex beat, receiving tambour for carotid with zero pressure valve, set of four glass receiving tambours for jugular and other venous pulses, and two rolls of prepared smoked paper strips, 20 meters long.

Duty Free..... 80.00

Duty Paid..... 102.00

43156. **Portable Polygraph**, similar to No. 43148 but with the addition of a sphygmomanometer and cuff for recording brachial pulse under varying pressures, with two recording tambours for use with the two remaining writing tambours (one being in connection with the brachial pulse) and two rolls of smoked paper, 20 meters long.

Duty Free..... 100.00

Duty Paid..... 128.00

43160. **Prepared Smoked Paper**, in rolls 20 meters long..... Duty Free..... .75 Duty Paid..... 1.00

43164. **Sphygmograph**, Lehmann, for taking the radial pulse..... 4.00 5.00

43168. **Cardiograph**, Lehmann, for apex beat..... 4.65 6.00

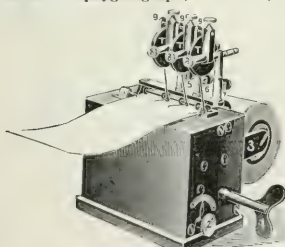
43172. **Pneumograph**, Lehmann..... 4.00 5.00

43174. **Portable Polygraph; Jaquet**, new model, with interchangeable writing points for both ink and smoked paper. Adjustable for speeds from 1 cm to 5 cm per second and for continuous tracing with time marker for  $\frac{1}{10}$  seconds. With three receiving tambours. In box without attachments.

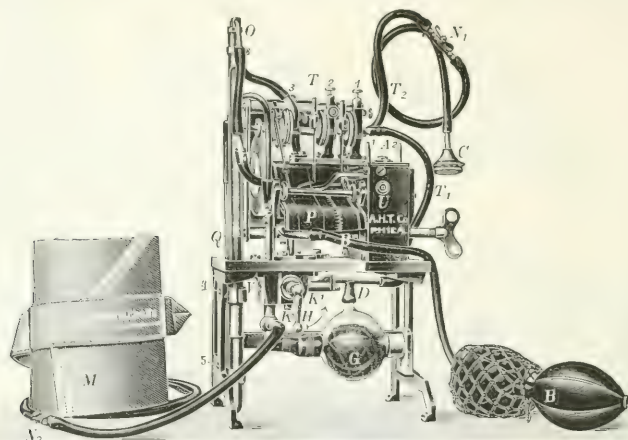
Duty Free..... 84.50 Duty Paid..... 109.85

43176. **Portable Polygraph; Jaquet**, complete outfit consisting of Polygraph as above with sphygmograph for radial pulse, cardiograph for apex beat, receiving tambour for carotid and two rolls of prepared paper.

Duty Free..... 96.25 Duty Paid..... 125.15



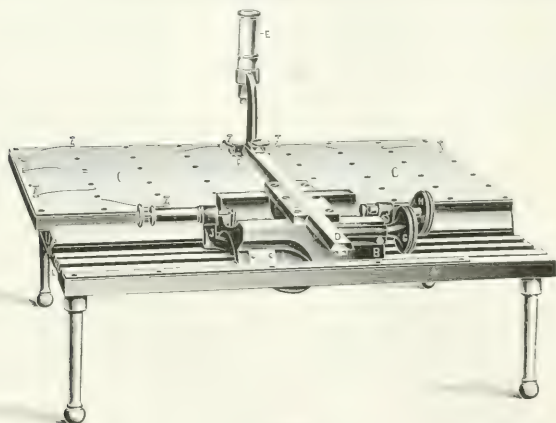
No. 43176



No. 43180

**USKOFF SPHYGMOTONOGRAPH.** The unique feature of this instrument is the simultaneous recording of blood pressure in millimeters of mercury, together with the brachial pulse at varying pressures, and one other tracing (jugular, carotid, apex beat, etc.) In other words, there are four tracings upon the paper, three of which are fixed by the limits of the apparatus, i. e. blood pressure in millimeters of mercury, arterial pulsations at various pressures and time tracing, while the fourth tracing may be taken at will from such sources as carotid, jugular, apex beat, etc. The instrument has been recently remodeled and improved, particularly by the addition of a continuous paper roll attachment, carrying 20 meters of prepared smoked paper, which is now recommended for use with the instrument. The instrument is now also provided with two speeds at the suggestion of Dr. Geo. W. Norris, of Philadelphia. See *Kraus und Hirsch, Krankheiten des Zirkulationsorgans, in Fortschritte der gesamten Medizin*, 43, Jahrgang II f. 121 and *Dr. Lindemann Münchener Medizin. Wochenschrift* Nr. 45, 1908 f. 2338.

43180. **Uskoff Sphygmotonomograph**, new model with two speeds and continuous paper roll attachment, including von Recklinghausen's arm cuff and polished mahogany case and one box containing 20 meters of smoked paper recording strips ready for use.  
 Duty Free ..... 110.75      Duty Paid ..... 145.00
43182. **Uskoff Sphygmotonomograph** as above, but with the addition of a receiving tambour with zero pressure valve, four glass receiving tambours for jugular and other venous pulses, cardiograph attachment for taking apex beat and two boxes smoked recording paper strips, 20 meters each.  
 Duty Free ..... 120.00      Duty Paid ..... 155.00
43184. **Continuous roll of smoked recording papers**, 20 meters long ..... 1.00  
 43188. **Glazed Paper Recording Strips**, 510 mm long, for use with instruments not provided with continuous roll attachment and which must be smoked before using ..... .75



No. 43192

43192. **Curve Analyzer, Jaquet**, for the accurate measuring and analysis of tracings as taken in Physiological or other work. See *Jaquet, Studien über graphische Zeitregistrierung. Zeitschrift für Biologie*, Bd. XXVIII.  
 Duty Free ..... 68.75  
 Duty Paid ..... 90.00





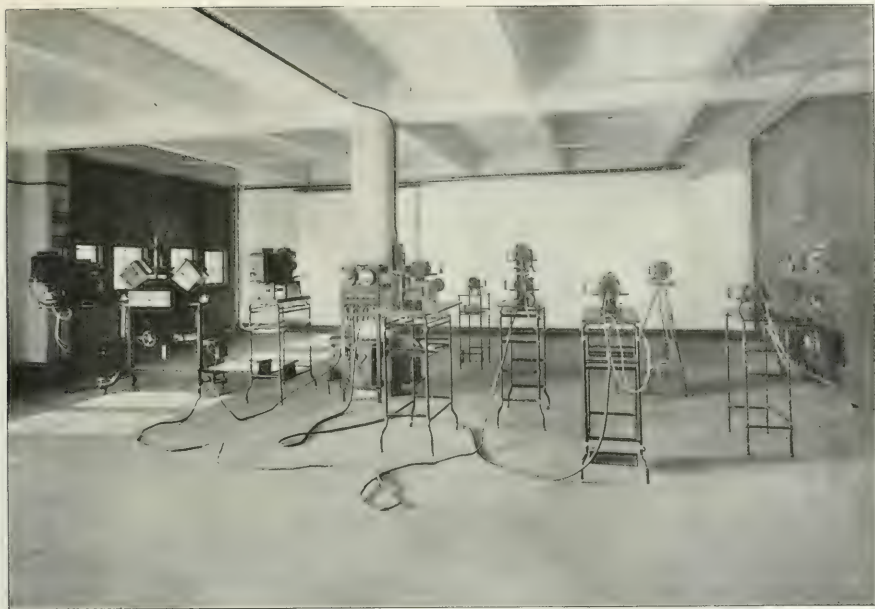




Cambridge Electro Cardiographic Apparatus in Position for Operation

**ELECTRO CARDIOGRAPHIC OUTFIT, Cambridge Scientific Instrument Company Outfit No. 2,** recommended as a most complete installation for research laboratories and hospitals. Prices given are in English currency and are f. o. b. Cambridge, England. Duty free and duty paid prices, f. o. b. Philadelphia, are quoted on request. Component parts are supplied at separate prices given. Numbers in text refer to original C. S. I. Co. Catalogue which is sent upon request.

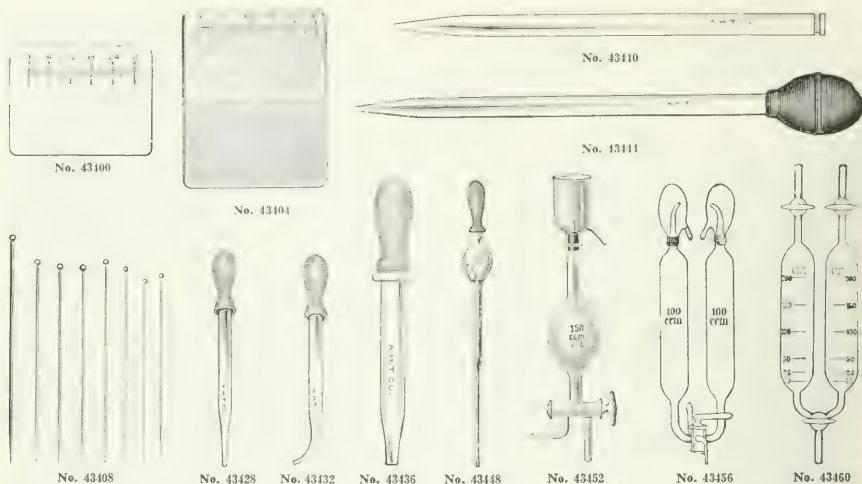
		£	s.	d.
43260.	Einthoven String Galvanometer, consisting of No. 53112 field wound for 10 and 20 volts; No. 53151 Fibre Case with silvered glass fibre; optical system consisting of Zeiss No. 12 compensating eye-piece No. 34633 and two small diameter Zeiss objectives, i. e., 16 mm apochromat No. 34613 and AA achromat No. 34623.....	66	0	0
43264.	Spare Fibre Case, with fibre, No. 53151.....	14	17	0
43268.	Double Fibre Case, permitting the simultaneous recording of both electro and phonocardiograms on one plate and with but one galvanometer.....	27	10	0
43272.	Battery, 10 volt, 50 ampere-hour, to excite galvanometer field, No. 53914....	5	15	6
43276.	Plate Cameras, No. 53311, to take plates $7\frac{1}{2} \times 5$ inches, $6\frac{1}{4} \times 3\frac{1}{4}$ inches, $18 \times 13$ cm and $17 \times 8.5$ cm, with three dark slides with 3 doz. $6\frac{1}{4} \times 3\frac{1}{4}$ inch plates..	49	10	0
43280.	Paper Camera, with 100 volt motor and reduction gear, No. 53334.....	50	12	0
43284.	Automatic Projection Lantern, No. 53411, with series resistance for use on 110 volts. No. 53412.....	17	1	0
43288.	Rotary Time Marker, consisting of synchronous motor, vibrating bar No. 53241, stand No. 53242 and spoked disc to give 5ths and 25ths of a second. No. 53246.....	13	4	0
43292.	Battery, 4 volt, 20 ampere hour, No. 53912, for use with above Time Marker	1	3	2
43296.	Cardiograph Control Board, No. 53211.....	39	12	0
43300.	Large Dry Cell, for above, No. 53921.....		6	6
43304.	Pair of Tables, to carry above apparatus, Nos 53353 and 53354.....	17	12	0
43308.	Two Non-polarizable Hand Electrodes, "F" of illustration, immersion type, No. 53511.....	1	13	0
43312.	Two Insulated Wooden Stands, for above, No. 53515.....	1	2	0
43316.	Non-polarizable Foot Electrode, immersion type, No. 53512.....	2	4	0
43320.	Insulated Wooden Stand, for above, No. 53516.....		11	0
43324.	Twin Flexible Cable, for various connections, No. 49326, twenty yards.....		11	0
43328.	Button Insulators, for fixing above cable, No. 49388, three dozen.....	2	6	
43332.	Complete Outfit, as above.....			
			309	6 8
<b>Additional Equipment Necessary for Taking Phono-Cardiograms.</b>				
43336.	Special Transformer, No. 53611, with Sensitive Microphone on antivibration suspension, etc., No. 53612.....	11	11	0
43340.	Rheostat, to adjust primary current, resistance approximately 40 ohms, No. 53931.....		16	6
43344.	Accumulator, 4 volt, 20 ampere-hour, to supply current for primary, No. 53912.....	1	3	2
43348.	Complete set of above accessories.....		13	10 8



View of Projection Room in use as Showroom



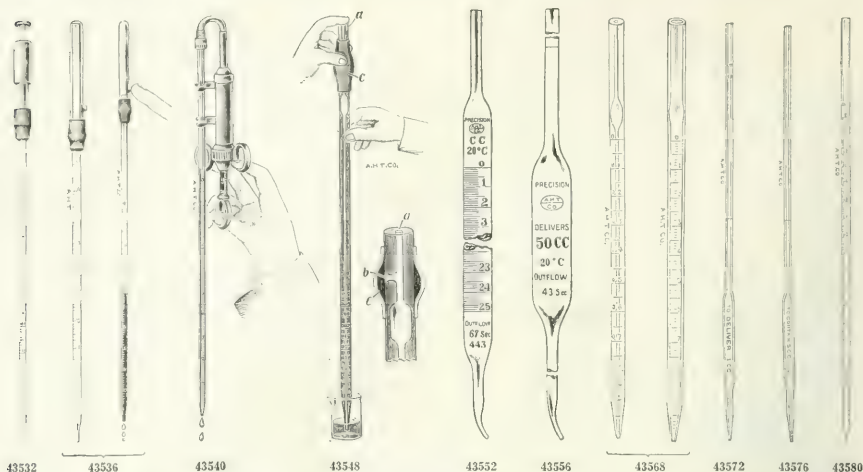
View of Projection Room in use as Dark Room



43400.	Pill Tiles, of glazed porcelain, square, with graduations. Size, inches.....	6	10
	Each.....	.40	1.50
43404.	Pill Tiles, of plate glass, square, engraved on the under side to be read through the glass; with the surface slightly roughened to hold pill mass while rolling; perfectly level and impervious to grease. Size, inches.....	8 x 10	10 x 12
	Each.....	1.50	2.00
43408.	Pins, Insect, Klaeger, special patent, black japanned steel pins. In packages of 100 and not sold in less than 100 of a size. Number.....	000	00-0
	Per 100.....	.25	.20
43412.	Pins, Insect, Klaeger "Minuten Nadeln," black, for pinning small insects. Per 100.....		.15
43416.	" A. E. Co.'s indestructible. Number.....	00-0	1-7
	Per 100.....	.30	.25
43420.	Pipe, Pure Block Tin, convenient for laboratory connections, water worms, etc. Weights given are for walls of medium thickness. Other sizes or weights to order. Inside diameter, inches..... $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $1$ Approximate weight per foot, ounces.... 3 $\frac{3}{4}$ 4 5 6 11 14 Per lb.....	.75	.75
		.75	.75
		.75	.75
43424.	Pipe, Lead. Weights are given for walls of medium thickness. Other sizes or weights to order. Inside diameter, inches..... $\frac{1}{8}$ $\frac{3}{16}$ $\frac{1}{4}$ $\frac{5}{16}$ $\frac{3}{8}$ $\frac{1}{2}$ $\frac{5}{8}$ $1$ Approximate weight per foot, ounces.... 16 16 20 32 36 43 Per lb.....	.12	.12
		.12	.12
		.12	.12
43428.	Pipette, Dropping, 4 inches long, with straight top and bulb of red, non-blooming rubber of superior quality. Not to be confused with the ordinary medicine dropper. Per dozen.....		.40
43432.	Pipette, Dropping, same as above but with curved tip. Per dozen.....		.40
43436.	Pipette, Dropping, with glass tube of large bore and extra large rubber bulb, suitable for removing large pieces of sediment, small embryos, etc. Each.....		.10
43440.	Pipettes, Dropping, straight, without bulb. Length, mm.....	200	300
	Each.....	.05	.07
43444.	Pipettes, Dropping, same as above but with black rubber bulb about 20 cc capacity. Length, mm.....	200	300
	Each.....	.15	.20
43448.	Pipette, Dropping, Automatic, with rubber bulb. Very convenient for filling ampoules with repeated doses of 1 cc. Each.....		1.00
43452.	Pipettes, Automatic, with three-way stopcock. Capacity, cc.....	10	25
	Each.....	2.25	2.75
		3.00	4.00
43456.	Pipette, Double Automatic, Friedrichs, with stopcock, so made that one pipette fills while the other empties. Capacity, cc.....	25	50
	Each.....	6.75	7.00
		7.75	12.00
43460.	Pipette, Double Automatic, Rothe, for the rapid determination of iron by the ether method.....		12.00







43532. **Pipette, Weichardt Hygienic**, for bacteriological and serological work. With air filter in metal capsule and screw adjustment to control delivery of small drops. Capacity,  $\frac{1}{100}$  cc in  $\frac{1}{100}$ ths. .... 3.00
43536. **Pipette, Wassermann Safety**, for bacteriological and serological work. The glass cap with tubulation is withdrawn with finger over the opening, thus filling the pipette. Withdrawal of the finger from the tubulation provides exact control of the delivery. With pipette  $\frac{1}{100}$  cc in  $\frac{1}{100}$ ths, graduated to tip. .... .75
43540. **Pipette, Syringe, Wöithe**, for bacteriological and serological work. Complete with precision pipette 1 cc in  $\frac{1}{100}$ ths. .... 6.00
43544. **Syringe only** for above. .... 5.25
43548. **Pipette Safety, Permin**, for bacteriological and serological work. Capacity cc. ....  $\frac{1}{16}$  1  
Graduated to, cc. ....  $\frac{1}{100}$   $\frac{1}{100}$  1.10  
Each. .... .75

**PIPETTES, PRECISION**, graduated by weighing at 20° C. in accordance with the specifications of the Physikalisch-Technische Reichsanstalt with individual control number, etc. These pipettes are offered with our unofficial factory certificate and, in addition, with the Physikalisch-Technische Reichsanstalt certificate and control stamp, i.e., the official certificate of the German government.

#### Precision Pipettes with Unofficial Factory Certificate.

These certificates are made out in the factory in exact accordance with the methods used by the Physikalisch-Technische Reichsanstalt and no pipette is certified unless the error falls within the limit permitted by the P. T. R. The data on these certificates may be used as a check where pipettes are calibrated in the laboratory or with entire reliance upon the accuracy of the figures given.

43552. **Pipettes, Mohr, Precision**, with unofficial factory certificate.
- |                        |                 |                |                |                |                |                |                |                |
|------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Capacity, cc. ....     | 1               | 1              | 2              | 2              | 5              | 10             | 25             | 50             |
| Graduated to, cc. .... | $\frac{1}{100}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |
| Each. ....             | .95             | .80            | 1.00           | .85            | 1.15           | 1.25           | 1.75           | 3.00           |
43556. **Pipettes, Volume or Transfer, Precision**, with unofficial factory certificate.
- |                    |     |     |     |     |     |     |     |     |     |     |      |      |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| Capacity, cc. .... | 1   | 2   | 3   | 5   | 10  | 15  | 20  | 25  | 30  | 50  | 100  | 200  |
| Each. ....         | .40 | .40 | .45 | .45 | .50 | .55 | .60 | .70 | .80 | .90 | 1.15 | 1.60 |

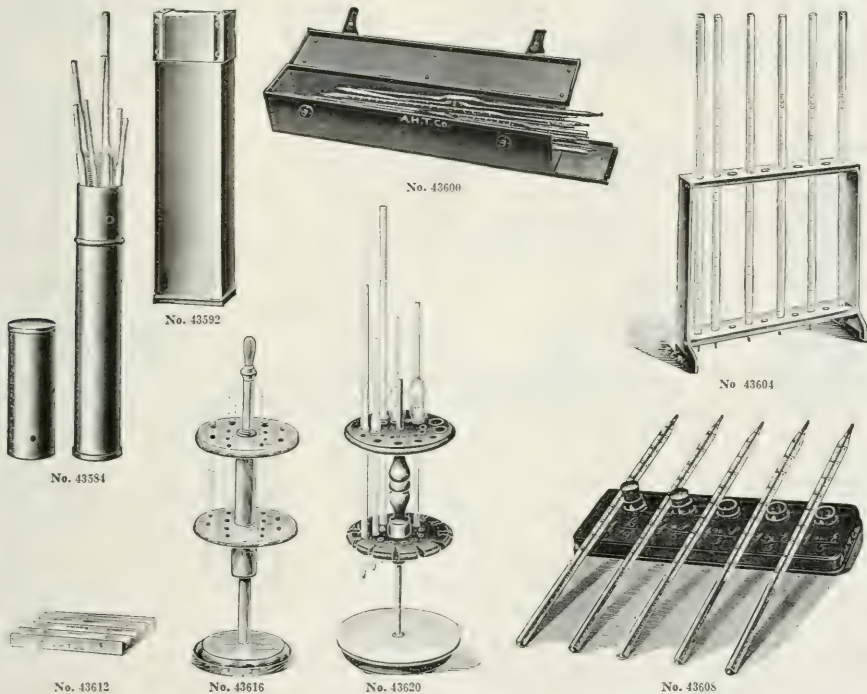
#### Precision Pipettes, with Physikalisch-Technische Reichsanstalt Certificate.

These pipettes are exactly the same as those described above in workmanship and accuracy but are furnished with the official Physikalisch-Technische Reichsanstalt certificate and control stamp, for which a higher price must be charged because of the German government fee.

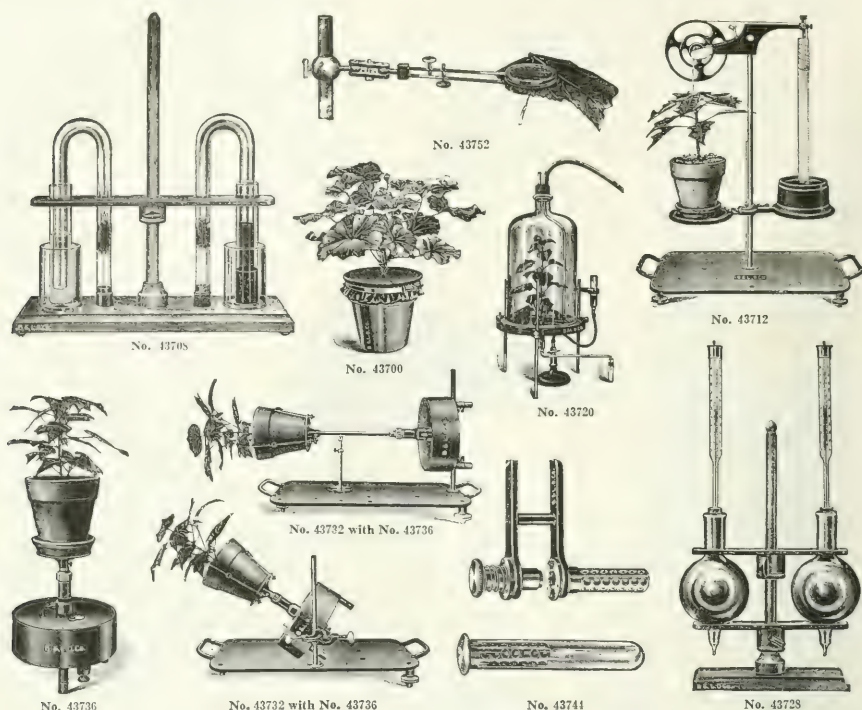
43560. **Pipettes, Mohr, Precision**, with P. T. R. certificate.
- |                        |                 |                |                |                |                |                |                |                |
|------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Capacity, cc. ....     | 1               | 1              | 2              | 2              | 5              | 10             | 25             | 50             |
| Graduated to, cc. .... | $\frac{1}{100}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ | $\frac{1}{10}$ |
| Each. ....             | 3.00            | 3.00           | 3.10           | 3.00           | 3.15           | 3.45           | 5.25           | 6.20           |
43564. **Pipettes, Volume or Transfer, Precision**, with P. T. R. certificate.
- |                    |      |      |      |      |      |      |      |      |      |      |      |      |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Capacity, cc. .... | 1    | 2    | 3    | 5    | 10   | 15   | 20   | 25   | 30   | 50   | 100  | 200  |
| Each. ....         | 1.50 | 1.50 | 1.50 | 1.50 | 1.60 | 1.65 | 1.70 | 1.75 | 1.80 | 1.95 | 2.40 | 3.10 |
43568. **Pipettes, Serological, Precision**, with graduations extended to the tip. Recommended where great accuracy is required; with P. T. R. certificate. Capacity, cc. ....  $\frac{1}{16}$  1 1  
Graduated to, cc. ....  $\frac{1}{100}$   $\frac{1}{16}$   $\frac{1}{16}$  1  
Each. .... 3.00 3.00 3.00

**PIPETTES, PRECISION**, as used in the Hygienic Laboratory of the U. S. Public Health Service for determining the immunity unit in the standardization of diphtheria antitoxin. See *Hygienic Laboratory Bulletin No. 21*. These pipettes are standardized at 20° C. in accordance with the requirements of the Bureau of Standards but are regularly furnished without certificate. They are furnished with certificates of either the Bureau of Standards or the Physikalisch-Technische Reichsanstalt on special order only. Outside diameter of the bulbs is in no case greater than 10 mm in order to permit use with special graduated cylinders used in the same technique. See illustration on preceding page.

43572.	Pipette Volumetric, Precision, graduated to deliver 1 cc. For purpose of easy manipulation this pipette is supplied with two etched bands near top.										
43576.	Pipettes, Volumetric, Precision, as above, graduated to contain.										
	Capacity, cc.....	1	2	3	4	5	6	7	8	9	10
	Each.....	.75	.75	.75	.75	.75	.85	.90	.95	1.00	1.10
43580.	Pipettes, Graduated, Precision, so-called "Ehrlich" pipettes, graduated in $\frac{1}{100}$ cc.										
	Graduated from.....	.01 to 1 cc		.07 to 2 cc		1.5 to 3 cc					
	Each.....	2.50		2.50		2.50					



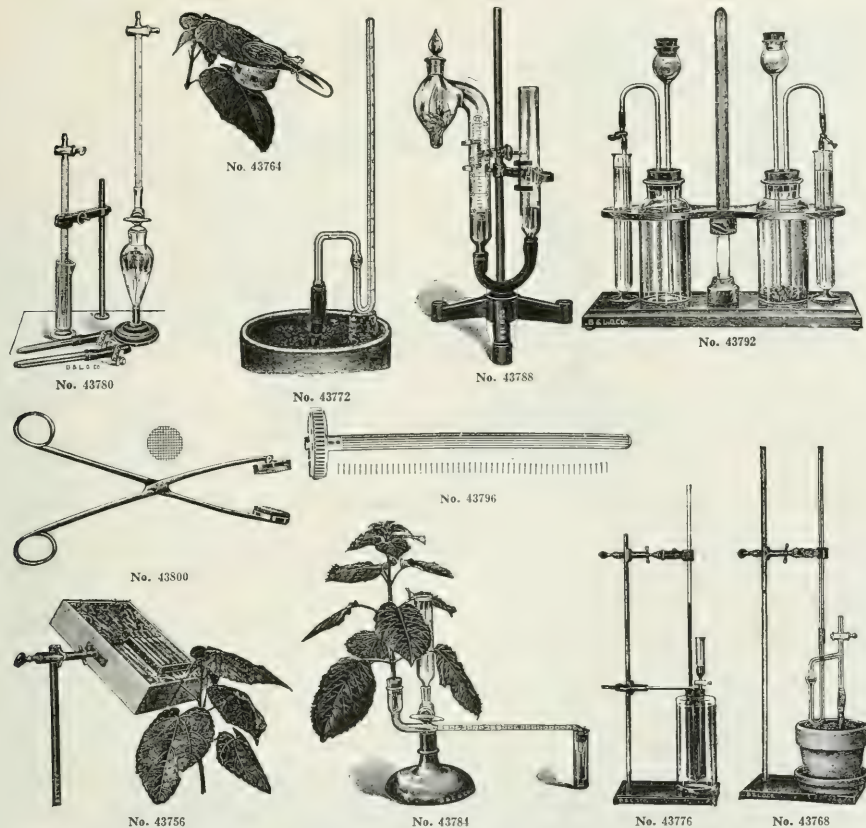
43384.	<b>Pipette Box</b> , for sterilizing pipettes, cylindrical form, of polished copper, with tightly fitting lid, 2½ inches in diameter by 16 inches high. Will take about 75 graduated pipettes, 1 cc in $\frac{1}{10}$ ths or about 15 of the same 10 cc in $\frac{1}{10}$ ths.			1.75
43588.	<b>Pipette Box</b> , same as above but of sheet iron.			1.25
43592.	<b>"</b> rectangular form, for sterilizing pipettes in bacteriological work, of copper.			
	Size, inches.....	$1\frac{1}{2} \times 2\frac{1}{2} \times 10$	$1\frac{1}{2} \times 2\frac{1}{2} \times 16$	
	Each.....	1.75	2.50	
43596.	<b>Pipette Box</b> , same as above but of sheet iron.			
	Size, inches.....	$1\frac{1}{2} \times 2\frac{1}{2} \times 10$	$1\frac{1}{2} \times 2\frac{1}{2} \times 16$	
	Each.....	1.25	1.50	
43600.	<b>Pipette Box</b> , for sterilizing and transporting pipettes, with lid and removable end; of brass, nickel plated, with asbestos lining; 2 inches deep by 4 inches wide by 16 inches long.			7.50
43604.	<b>Pipette Support</b> , of brass, nickel plated.			1.75
43608.	<b>Pipette Rest</b> , with ground glass surface for writing.			3.00
43612.	<b>"</b> of porcelain, for pipettes, stirrers, etc., 75 x 65 mm.			.75
43616.	<b>Pipette Support</b> , of polished hardwood, revolving.			2.50
43620.	<b>Pipette Support</b> , for 24 pipettes. perforated discs are of polished wood, upright support of brass and base of glazed porcelain.			5.50



**PLANT PHYSIOLOGY APPARATUS, GANONG.** The apparatus here listed has been developed during a period of ten years by Prof. W. F. Ganong, of Smith College, and manufactured by the Bausch & Lomb Optical Company. A special catalogue entitled, "*Ganong Botanical Apparatus for use in Plant Physiology*," 53 pp. with introduction and descriptions of the apparatus with method of use, by Prof. Ganong, is sent on application. The use of the apparatus finds fuller descriptions in Ganong, "*A Laboratory Course in Plant Physiology*," Henry Holt & Co., New York and Ganong, "*The Teaching Botanist*," the Macmillan Co., New York.

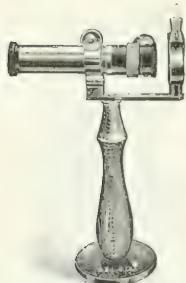
43700.	Aluminum Shells, for transpiration experiments, consisting of shell with band and screw as shown in illustration, but without rubber roof. Diameter, inches.....	3	4	5
	Each.....	1.25	1.75	2.75
43704.	Rubber Tissue, medium thickness, for use as roofs. Per ounce.....			.30
43708.	Anoxoscope, Demonstration, for showing the necessity for oxygen in plant growth. Complete with 5 oz. of caustic potash and 1 oz. of pyrogallie acid.....			4.25
43712.	Auxograph, Demonstration, for recording the rate and amount of growth. Complete with chain attachment for plant.....			25.00
43716.	Extra Recording Cylinder.....			1.50
43720.	Bell Jar Support, with split glass plate but without bell jar and Potometer as shown in illustration.....			10.00
43724.	Bell Jar, only, for above, complete with two hole rubber stopper and glass tubes.....			3.25
43728.	Caloriscopes and Calorimeter, for demonstrating the release of heat in respiration. Complete with two silvered Dewar bulbs, 500 cc, with thermometers and wooden support.....			18.00
43732.	Clamp Stand, portable, for use with Demonstration Clinostat, complete with two rods.....			8.00
43736.	Clinostat, Demonstration, for use either obliquely or horizontally in connection with the Clamp Stand above listed. Will take a 4 inch pot but operates with greater accuracy with a pot 3 inches in diameter. Complete with clockwork with disc, screw rods, spindle arm and extensible support, but without Clamp Stand.....			22.50
43740.	Gas Analysis Tubes, for demonstration of the percentage of carbon dioxide contained in a sample of gas. With two reagent tubes, suitable rubber connections and graduated stopcock gas tube.....			2.00
43744.	Leaf Area Cutter, for demonstrating the increase of organic substances through photosynthesis. With two cups, test tube and holder for same.....			12.00
43748.	Leaf Clasp, for applying special treatment to two exactly corresponding areas on the leaf surface as, for instance, Stahl's cobalt chloride method in the study of transpiration. Without support.....			6.50
43752.	Support, for above.....			.35



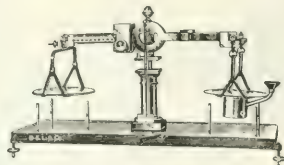


43756. **Light Screen**, whole leaf form, with screen box with adjustable clamp, 7 x 7 clear glass plate with ground edges, two half plates with ground edges and 1 sq. ft. of tin foil, but without color screen bottles and support..... 9.00
43760. **Support**, for above..... .35
43761. **Light Screen**, part leaf form, as shown in illustration, with  $\frac{1}{2}$  sq. ft. of thin tin foil..... 1.25
43768. **Manometer, Demonstration Root-pressure**, showing the force with which roots start the sap up the stems. With clamp and vertical support, 2 inches of rubber tubing, two feet of tire tape, 1 oz. of stopcock wax and 10 cc of mercury..... 4.75
43772. **Manometer, Normal**, for measuring liquid pressure, particularly osmotic pressure, etc. With two glass sleeves, rubber tubing and tire tape for connections, 2 cc of mercury and 1 oz. of shellac for sealing..... 1.50
43776. **Osmoscope, Demonstration**, to show osmotic absorption before the class. With support and clamps, storage bottle and two extra lengths of parchment paper tubing..... 4.25
43780. **Photosynthometer**, for accurate measurement of the absorption of carbon dioxide by green plants in light with the equivolumetric release of oxygen. Complete with reagent tubes, rubber connections, clamps and cylinder but without support and clamp..... 5.25
43784. **Potometer**, for the quantitative determination of transpiration by the measurement of water absorption by a cut shoot. With split rubber stopper, 1 oz. of stopcock wax, vial and slide piece..... 3.75
43788. **Respirometer**, for demonstrating and measuring the gas exchanges in typical respiring material as, for instance, in germinating seeds. With rubber connection, two clamps and support..... 8.25
43792. **Respiroscope, Demonstration**, for showing the elimination of carbon dioxide to large classes. With 1 oz. of calcic oxide and 1 liter bottle for limewater..... 4.50
43796. **Space Marker, Root and Stem**..... 1.00
43800. **" " Leaf**..... 2.00

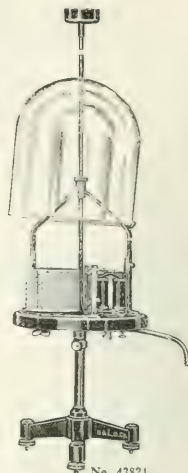




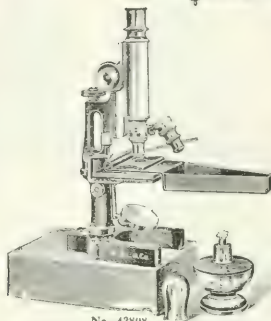
No. 43804



No. 43820



No. 43821



No. 43808



Nos. 43832 to 43841

43804. Spectroscope, designed specially to show the absorption spectrum of chlorophyll in the study of the energy relations of photosynthesis. Consisting of Browning direct vision spectroscope with comparison prism, handle, frame and vial..... 24.50
43808. Temperature Stage, for use on the microscope to show the relation of the rate of protoplasmic streaming to changes of temperature. With clamp and felt mat but without other accessories... 4.00
43812. Thermometer, for above..... 1.50
43816. Spirit Lamp, for above..... .45
43820. Transpiration Balance, for measuring the alteration in weight as an accurate index of transpiration. Duly Free..... 80.00
43824. Transpirometer, a new self-registering transpirometer for both demonstrations and investigations. With 150 ball weights and 25 record papers..... 75.00
43828. Record Papers, per dozen..... .25
43832. Water Culture Vessels, consisting of Aluminum Double Support..... 1.75
43840. Tumbler, plain glass, with felt paper cover..... .10
43844. Paraffine, hard, for coating the supports, per lb..... .20
43848. Lamblack, per lb..... .12



View of Stock Room Where Goods are Stored in Original Cases



No. 43900



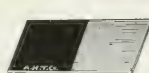
No. 43904



No. 43916



No. 43920



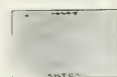
No. 43936



No. 43948



No. 43960



No. 43964



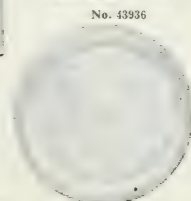
No. 43908



No. 43912



No. 43944



No. 43956



No. 43940

43900.	Plates, Glass, circular, plain, edges not ground.								
	Diameter, mm.....	75	100	150	200				
	Each.....	.06	.08	.15	.25				
43904.	Plates, Glass, circular, ground on one side, edges not ground.								
	Diameter, mm.....	75	100	150	200				
	Each.....	.08	.10	.18	.30				
43908.	Plates, Glass, with edges slightly ground and hole in center to admit stirring rod. Convenient for use as covers.								
	Diameter, mm.....			75	100				
	Each.....			.25	.30				
43912.	Plates, Glass, same as above but with hole at one edge.								
	Diameter, mm.....			75	100				
	Each.....			.25	.30				
43916.	Plates, Glass, square, plain, edges not ground.								
	Size, mm.....	75	100	125	150	200			
	Each.....	.03	.04	.06	.08	.16			
43920.	Plates, Glass, square, ground on one side, edges not ground.								
	Size, mm.....	75	100	150	200				
	Each.....	.04	.05	.10	.20				
43924.	Plates, Heavy Plate Glass, square, ground on one side, edges not ground.								
	Size, mm.....	150	175	200	225	250	300		
	Each.....	.30	.35	.40	.50	.80	1.00		
43928.	Plates, Heavy Plate Glass, square, ground on one side, with edges ground.								
	Size, mm.....	150	175	200	225	250	300		
	Each.....	.35	.45	.55	.70	1.00	1.25		
43932.	Plates, Blue Glass, so-called "Cobalt" glasses, for observing the potassium flame; edges not ground.								
	Size, mm.....	50 x 50	50 x 75	75 x 75	50 x 100	75 x 100	100 x 100		
	Each.....	.04	.05	.06	.06	.08	.10		
43936.	Plates, Glass, 200 x 100 mm, of finest plate glass 7 to 8 mm thick, with one end finished in pitch black and the other in pure white. For examination of sputum, feces, etc.....								.75
43940.	Plates, Porcelain, perforated, for use in funnels.								
	Diameter, mm.....	25	38	50	75	100	125	150	175
	Each.....	.15	.20	.25	.40	.60	.75	1.00	1.00
43944.	Plates, Royal Berlin Porcelain, for color reactions, 110 x 90 mm, with twelve concavities. Very superior to the common porcelain plate usually supplied.....								.75
43948.	Plates, Opaque Fused Silica, unglazed, preferable for use as heating plates to wire gauze on account of their cleanliness and absolute resistance to corrosion. Will stand extreme changes of temperature without cracking.								
	Size, inches.....	3 x 3	4 x 4	6 x 6	9 x 9	12 x 12			
	Each, $\frac{1}{8}$ inch thick.....	.27	.48	1.08	2.43	4.32			
	Each, $\frac{1}{4}$ inch thick.....	.54	.96	2.16	4.86	8.64			
43952.	Plates, Opaque Fused Silica, glazed throughout, $\frac{1}{8}$ inch thick.								
	Size, inches.....	3 x 3	4 x 4	6 x 6	9 x 9	12 x 12			
	Each.....	.72	1.28	2.88	6.48	11.25			
43956.	Plates, Porous, circular, for drying crystals and precipitates, 250 mm diameter.....								.15
43960.	" " square, for drying crystals and precipitates.								
	Size, mm.....	150	200	300	400				
	Each.....	.25	.55	1.25	3.00				
43964.	Plate, Streak, Royal Berlin Porcelain, unglazed, as used for arsenic test and by mineralogists; 100 x 65 mm.....								.45

## PLATINUM WARE

The Platinum Ware listed below is genuine hammered ware from selected factories in both Europe and America. Our relations with the leading manufacturers enable us to offer it at the current daily quotations observed in the platinum trade. Most of the items listed can be furnished immediately from our own stock and when this is impossible delivery usually requires only three or four days. Approximate weights are given without price. The current prices per gram for the different classifications of ware used in the platinum trade are inserted from time to time on colored slips as our catalogues are sent out.

## The Care of Platinum Ware.

W. C. Heraeus, in the *Zeitschrift für angewandte Chemie*, 1932, Heft 37—and 1937, Heft 41, explains the causes of the destruction of platinum crucibles in the making of phosphate analyses and refers to the fact that the destruction of platinum ware (which is always only a chemical change of its properties) might in many cases be prevented if the crucibles or dishes were not exposed to unnecessarily high temperatures during the process of annealing.

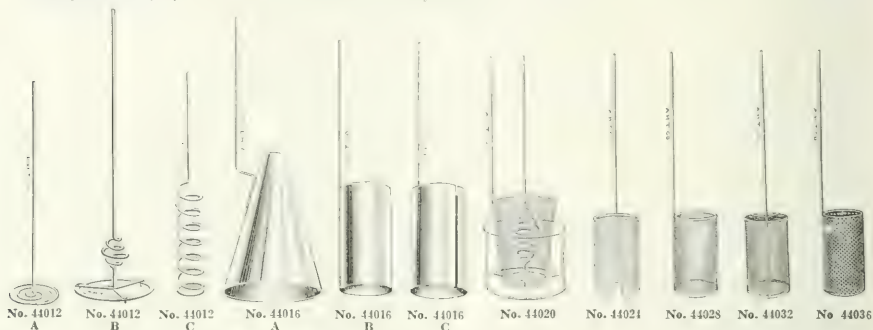
The uniting of platinum with carbon, silica, boron, phosphorus, etc., takes place only when the different salts are reduced at comparatively high temperatures.

The susceptibility of platinum toward hydrogen and hydrocarbon while annealing accelerates the reductions considerably. When the combustion is made in a gas furnace, Rosessler furnace, etc., care should be taken for obvious reasons, that there is no reducing atmosphere in the furnace. The use of acetylene gas for the annealing of platinum ware is also harmful to the platinum.

The combustion of organic substances should be done at low temperatures and the annealing over a blowpipe or in a furnace only when all the carbon has been volatilized. At high temperatures platinum is very readily attacked when the melting of alkaline or alkali carbonate is done in the presence of sulphur or cyanide of potassium.

Metals of a low melting point and easily reducing oxides of metals should, of course, not be annealed in platinum; the same may be said of all reagents which give up chlorine, boron, iodine, sulphur or phosphorus.

Frequent cleaning of platinum ware with sea-sand removes alloys formed on the surface.



**44000. Platinum Foil.** This is carried in stock 8 inches wide and can be furnished in any length up to 24 inches.

	Light	Medium	Heavy
Thickness, mm. . . . .	.03	.04	.05
" inches . . . . .	.00118	.00157	.00196
Approximate weight per square inch, grams. . . . .	.353	.530	.705

**44004. Platinum Wire.** Platinum loops for chemical laboratory work are usually made of No. 26 wire, as are platinum inoculating needles for bacteriological work. For a stiff inoculating needle we recommend No. 24. All weights given are approximate.

	12	14	16	18	20	22	24
B. & S. gauge. . . . .	.080	.064	.050	.040	.031	.025	.020
Diameter, inches. . . . .	2.021	1.625	1.269	1.015	.787	.634	.507
mm. . . . .	21.27	13.62	8.31	5.36	3.20	2.08	1.33
Weight per foot, grams. . . . .	25	26	27	28	30	32	36
B. & S. gauge. . . . .	.017	.015	.014	.012	.010	.008	.005
Diameter, inches. . . . .	.431	.380	.355	.304	.253	.203	.126
mm. . . . .	.97	.75	.65	.48	.33	.213	.086
Weight per foot, grams. . . . .							

**44008. Platinum Wire, special for calorimetry, exactly  $\frac{1}{16}$  mm in diameter.**

	A	B	C
<b>44012. " Anodes. Style . . . . .</b>			
Height, mm. . . . .	125	150	125
Diameter of spiral, mm. . . . .	25	50	15
Approximate weight, grams. . . . .	5-6	20	8-10

	A	B	C
<b>44016. Platinum Cathodes. Style . . . . .</b>			
Diameter, mm. . . . .	57	25	25
Length of stem, mm. . . . .	75	75	75
Approximate weight, grams. . . . .	20	12	12

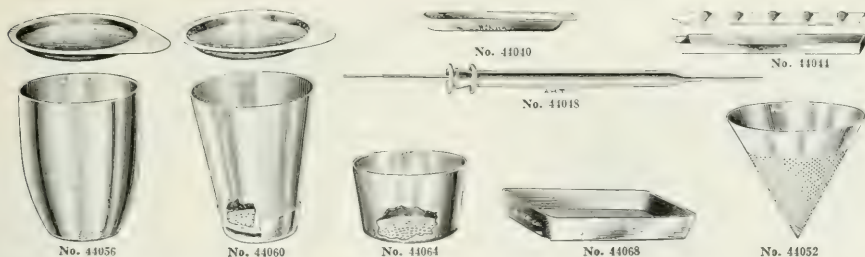
**44020. Platinum Gauze Cathode with wire frame Anode. Approximate weight 40 to 45 grams.**

**44024. Platinum Electrode, with open gauze cylinder. Height 2 inches, diameter 1 inch, of 52 mesh gauze. Approximate weight 12 grams.**

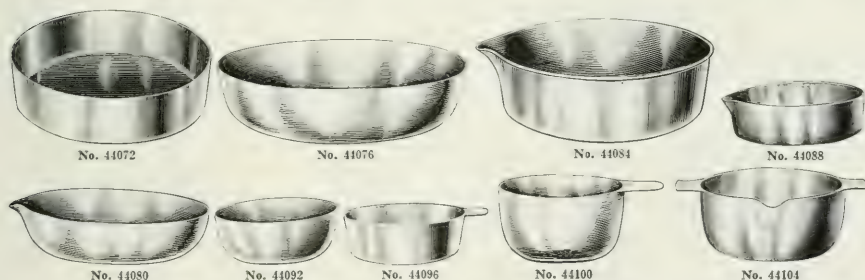
**44028. Platinum Electrode, with closed gauze cylinder. Height 2 inches, diameter 1 inch, of 52 mesh gauze. Approximate weight 10 grams.**

**44032. Platinum Electrode, with rotating gauze cylinder. Height 2 inches, diameter 1 inch, of 52 mesh gauze. Approximate weight 15 grams.**

**44036. Platinum Electrode, with perforated sheet cylinder. Height 2 inches, diameter 1 inch. Approximate weight 17 grams.**



- |        |  |               |               |     |     |      |      |      |    |    |
|--------|--|---------------|---------------|-----|-----|------|------|------|----|----|
| 44040. | <b>Platinum Combustion Boats.</b>  |               |               |     |     |      |      |      |    |    |
|        | Length, inches.....  | 1½            | 2             | 2½  | 3   | 3½   | 4    |      |    |    |
|        | Approximate weight, grams.....   | 3.0           | 4.0           | 5.5 | 8.5 | 10.0 | 12.0 |      |    |    |
| 44044. | <b>Platinum Combustion Boats, Blair,</b> $\frac{5}{16}$ inches deep by 5½ inches long, approximate weight 35 grams with or without cover.  |               |               |     |     |      |      |      |    |    |
| 44048. | <b>Platinum Combustion Tube,</b> seamless, with German silver fittings. As used in iron and steel analysis. Made in any desired length or in special shapes according to specifications. |               |               |     |     |      |      |      |    |    |
| 44052. | <b>Platinum Filter Cones,</b> seamless, with perforations .020 inches in diameter.   |               |               |     |     |      |      |      |    |    |
|        | Diameter, inches.....  | $\frac{1}{2}$ | $\frac{3}{4}$ | 1   | 1½  | 1½   | 2    |      |    |    |
|        | Approximate weight, grams....  | 1.0           | 1.5           | 2.5 | 4.0 | 6.0  | 8.0  | 12.0 |    |    |
| 44056. | <b>Platinum Crucibles.</b> Covers are always furnished unless otherwise ordered.   |               |               |     |     |      |      |      |    |    |
|        | Number.....  | 1             | 2             | 2   | 4   | 5    | 6    | 7    | 8  | 9  |
|        | Capacity, cc.....  | 8             | 10            | 15  | 20  | 25   | 30   | 40   | 50 | 60 |
|        | Approximate weight, grams.....   | 8             | 10            | 15  | 20  | 25   | 30   | 40   | 56 | 60 |
| 44060. | <b>Platinum Crucibles, Gooch form;</b> weight includes cover and cap.  |               |               |     |     |      |      |      |    |    |
|        | Capacity, cc.....  |               |               | 10  |     | 15   | 20   | 25   | 30 |    |
|        | Approximate weight, grams.....   |               |               | 13  |     | 18   | 24   | 29   | 34 |    |
| 44064. | <b>Platinum Crucible, Gooch, low form,</b> with bottom permanently fixed, as used in asphalt and bitumen analysis; capacity 30 cc, approximate weight 30 grams.                          |               |               |     |     |      |      |      |    |    |
| 44068. | <b>Platinum Incinerating Pan,</b> rectangular shape, with flat bottom.   |               |               |     |     |      |      |      |    |    |
|        | Capacity, cc.....  |               |               |     |     |      |      | 15   | 20 |    |
|        | Approximate weight, grams.....   |               |               |     |     |      |      | 10   | 14 |    |



- |        |  |    |    |    |
|--------|--|----|----|----|
| 44072. | Platinum Dish, flat bottom, with straight sides and without lip, as used in milk analysis, capacity 45 cc, approximate weight 17 grams.  |    |    |    |
| 44076. | Platinum Dish, without lip, as used in wine and water analysis; capacity 100 cc, approximate weight 20 grams.  |    |    |    |
| 44080. | Platinum Dish, with lip, as used in water analysis and iron and steel work, 45 cc capacity, approximate weight 16 grams.   |    |    |    |
| 44084. | Platinum Dish, Payne, flat bottom, with wire rim and lip, as used in fertilizer analysis; capacity 100 cc, approximate weight 40 grams.  |    |    |    |
| 44088. | Platinum Dish, with flat bottom and straight sides, with lip, as used in sugar analysis; 35 cc capacity, approximate weight 16 grams.  |    |    |    |
| 44092. | Platinum Dish, round bottom, without lip, as used in sugar analysis.   |    |    |    |
|        | Capacity.....  | 20 |    | 25 |
|        | Approximate weight, grams.....   | 10 |    | 12 |
| 44096. | Platinum Dish, flat bottom, with handle and without lip. As used in sugar analysis. This dish is also made for sugar work without handle and with lip. Please specify in ordering.                   |    |    |    |
|        | Capacity, cc.....  | 10 | 20 | 25 |
|        | Approximate weight, grams.....   | 10 | 14 | 18 |
| 44100. | Platinum Dish, deep form, with handle, as used in sugar analysis. Also used in sugar work with lip and without handle. Please specify form in ordering. Capacity 30 cc, approximate weight 16 grams. |    |    |    |
| 44104. | Platinum Dish, deep form, with two handles and lip. Capacity 45 cc, approximate weight 15 grams.   |    |    |    |

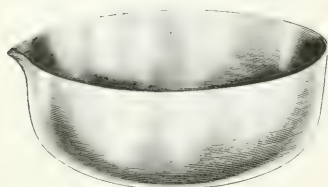




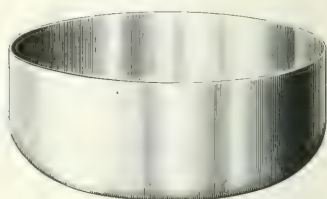
No. 44108



No. 44112



No. 44116



No. 44120

44108.	Platinum Dish, with flat bottom and straight sides, with lip.						
	Capacity, cc.....	80	100	125	200	250	300
	Approximate weight, grams.....	32	35	40	56	70	80
44112.	Platinum Dish, Blair, flat bottom, with or without lip, with either wire rim or solid rim. As used in iron and steel analysis.				280	380	525
	Capacity, cc.....				80	100	120
	Approximate weight, grams.....						
44116.	Platinum Dishes, with lip.	Capacity, cc.....	15	20	25	35	50
	Approximate weight, grams.....		5	6	8	12	17
	Capacity, cc.....		100	125	150	175	200
	Approximate weight, grams.....		33	42	50	55	67
44120.	Platinum Dish, Classen, for electrolytic separation, with either polished or sand blasted inner surface.						
	Capacity 250 cc, approximate weight 40 grams.						



No. 44124



No. 44128


No. 44124  
Square

No. 44128  
Square

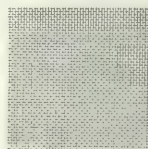

No. 44110



No. 44140



No. 44144



No. 44148



A



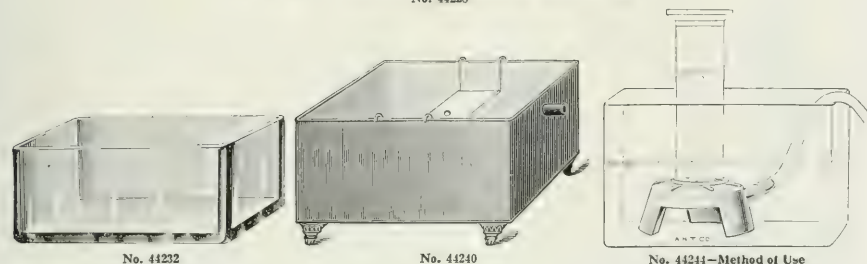
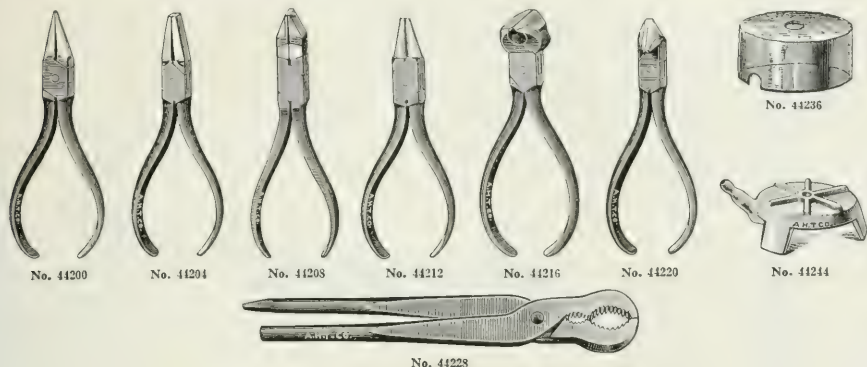
B



C

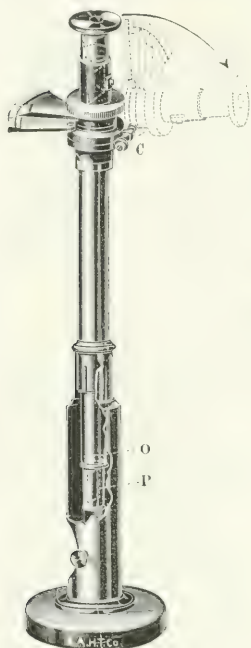
No. 44156

44124.	Platinum Spatula, round end or square end, 3 inches long, approximate weight 7.5 grams.								
44128.	“ “ same as above, but with wooden handle. Approximately same weight.								
44140.	Platinum Triangles, with either twisted or solid ends.								
	To take crucible, cc.....	10	15	20	25	30	40	50	60
	Approximate weight, grams.....	5.0	7.0	10.5	12.0	12.0	14.0	16.0	18.0
44144.	Platinum Pan, with holder, for calorimetry. Weight of pan 5 grams, weight of holder 6 grams.								
44148.	Platinum Wire Gauze. Mesh.....								
	Diameter of wire, inches.....							.004	.0085
	Approximate weight per square inch, grams.....							.550	1.500
44156.	Platinum Blowpipe Tips, as illustrated, types A, B or C.								



44200.	Pliers, steel, with pointed nose. Jaws are flat inside.			
	Length, inches.....	4	5	6
	Each.....	.40	.50	.60
44204.	Pliers, steel, with flat nose.			
	Length, inches.....	4	5	6
	Each.....	.20	.30	.35
44208.	Pliers, steel, with flat nose, side cutting.			
	Length, inches.....	5	6	8
	Each.....	.70	.80	1.40
44212.	Pliers, steel, with round nose. For bending, etc.			
	Length, inches.....	4	5	6
	Each.....	.20	.30	.35
44216.	Pliers, steel, end cutting.			
	Length, inches.....	4	5	6
	Each.....	.70	.75	.85
44220.	Pliers, steel, with diagonal jaws for cutting.			
	Length, inches.....	4	5	6
	Each.....	.75	.80	.90
44224.	Pliers, Button, straight, for holding buttons while brushing, 5 inches long.....			.50
44228.	Pliers, gas tongs or pipe wrench, 8 inches long.....			.80
44232.	Pneumatic Troughs, of heavy glass.			
	Length, mm.....	250	300	350
	Width, mm.....	150	200	250
	Height, mm.....	150	150	160
	Each.....	2.50	4.00	5.50
44236.	Cylindrical Shelf for pneumatic troughs, so-called "Beehive," of glass, 72 mm high by 104 mm diameter.....			.50
44240.	Pneumatic Troughs, of japanned tin, with sliding shelf and overflow.			
	Length, inches.....	10	10	12
	Width, inches.....	7	7	9
	Height, inches.....	4	5	6
	Each.....	1.25	1.35	1.50
44244.	Porcelain Shelf for pneumatic troughs, of glazed porcelain with radiating lugs on the top, tubulation for rubber tubing and three supporting legs. The tubulation connects with the center opening only. Method of use is shown in illustration.....			1.25

# POLARISCOPES

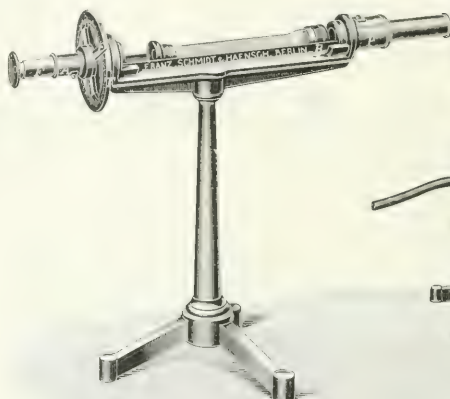


No. 44300

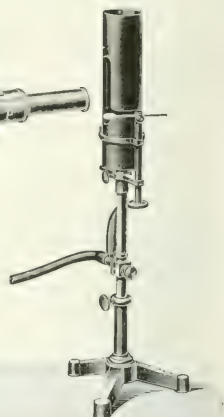
For Urine Analysis

For General Purposes

For Sugar Analysis



No. 44312



## Polariscopes for Urine Analysis.

- |        |   |       |
|--------|---|-------|
| 44300. | Polariscope, Ultzmann, for urine analysis by means of either day or lamp light. With a tube of special length so that the angular rotation in degrees is equivalent to 1% glucose content. By means of verniers readings are made to $\frac{1}{10}$ %. Complete with support as shown in illustration.  |       |
|        | Duty Free.....  | 28.50 |
|        | Stock.....  | 38.00 |
| 44304. | Extra Glass Tube for urine work.  |       |
|        | Duty Free.....  | 2.10  |
|        | Stock.....  | 3.50  |
| 44308. | Extra Glass Tube of 200 mm length by the use of which this instrument may be used for purposes other than urine analysis for substances where the specific rotary power is within the limits of the rotary scale.   |       |
|        | Duty Free.....  | 2.10  |
|        | Stock.....  | 3.50  |
| 44312. | Polariscope, Schmidt & Haensch, Mitscherlich, with Laurent Polarizer. With circular scale reading to 1° of arc and by means of verniers to $\frac{1}{10}$ °, equal respectively to 1% and $\frac{1}{10}$ % of glucose in urine when the special tube of 189.4 mm is used. For use only with monochromatic light from a sodium flame. With one patent tube of 189.4 mm and one tube of 94.7 mm and gas sodium lamp with platinum ring, but without case. |       |
|        | Duty Free.....  | 56.55 |
|        | Stock.....  | 75.40 |
| 44316. | Case, for above, of polished wood, with lock and key, taking polariscope tubes and vertical pillar but not providing for the lamp or tripod base.   |       |
|        | Duty Free.....  | 10.50 |
|        | Stock.....  | 14.00 |

## Explanation of the Use of Mitscherlich Polariscope in Urine Analysis.

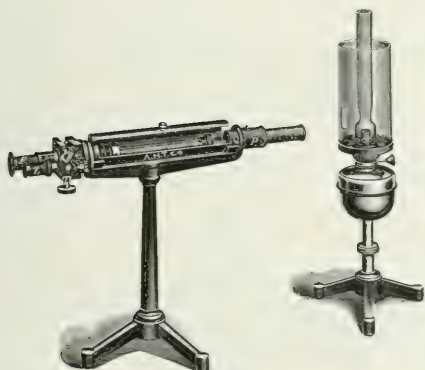
For urine analysis tubes of special length, i.e., 189.4 and 94.7 mm, enable the user to determine the percentage by volume of glucose in the urine without special calculation. When the longer tube, i.e., 189.4 mm, is used the rotation obtained in degrees of arc is directly equal to the amount in grams of glucose contained in 100 cc of the solution. When the tube of 94.7 mm is used for darkly colored specimens, the result must, therefore, be multiplied by two. As the specific rotary power of albumen is the same as that of glucose except that the latter is laevo rotatory while that of glucose is dextro rotatory, this fact enables the investigator to determine the percentage of albumen when same is present. The usual method of procedure is as follows:—

If the urine is not clear, i.e., if it is clouded, it must be filtered quickly through a soft filter paper. If it is so strongly colored that the dividing line cannot be clearly defined through the long tube, the shorter tube must be used. If this does not give a better result the urine must be slightly discolored by being poured into a flask containing pure dry animal carbon or by being mixed with  $\frac{1}{10}$  part of lead acetate and then filtered. In this case the reading of the rotation must be multiplied by 1.1. The temperature should be within 15 and 20° C.

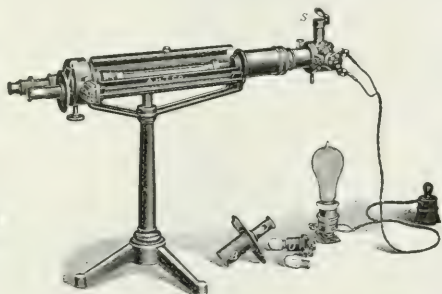
The tube is then filled and placed into the instrument and the reading in  $\frac{1}{10}$  degrees will give the percentage of glucose. If the urine contains albumen, two readings will be necessary. As albumen gives a rotation in the opposite direction to glucose, the total reading in presence of albumen will be equal to the number of degrees for glucose less than that for albumen. Before effecting the second examination the albumen must be removed. 100 cc is boiled in an evaporating dish and a few drops of acetic acid are added until the solution reacts as acid. The solution is then filtered and the filtrate washed and diluted to 100 cc at 15° C. The second polarizing test will now give the percentage of glucose and the difference between this reading and the former gives the percentage of albumen.

### Illustrations.

1. Almost colorless urine without albumen; clear. Observation tube 139.4 mm. Equal intensity in both halves of the field obtained after a turn of 2° to the right. Vernier mark 9 coincides with the circular division, i.e., 2.9°. Percentage of sugar = 2.9%.
2. Urine without albumen, clear, but of an intense color. Observation tube 94.7 mm. Equal intensities at 1.5°. Percentage of sugar =  $2 \times 1.5 = 3.0\%$ .
3. Brown urine, no albumen, 100 cc mixed with 10 cc lead acetate. Tube = 139.4. Equal intensities at 2.9°. Percentage of sugar  $2.9 \times 1.1 = 3.19\%$ .
4. Brown urine, no albumen. Tube = 94.7 mm. 100 cc mixed with 10 cc lead acetate. Equal intensities at 1.3°. Percentage of sugar  $1.3 \times 1.1 = 2.86\%$ .
5. Clear, almost colorless urine with albumen, tube 139.4 mm. a. Determination of the first rotation. Equal intensities after turning to left at .5°. b. Separation of the albumen; equal intensities without turning analyzer, i.e., at 0°.
6. Clear urine with albumen. a. First rotation, equal intensities at 2.7°. b. After removal of albumen; equal intensities at 3.1°. Percentage of sugar = 3.1%; of albumen  $3.1 - 2.7 = 0.4\%$ .
7. Sucrose solution. Observation tube = 139.4 mm; equal intensities at 5.2°. Percentage of sucrose =  $5.2 \times \frac{1}{2} = 3.9\%$ .



No. 44320

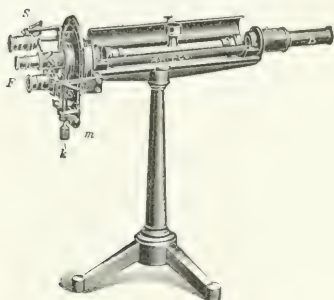


No. 44324

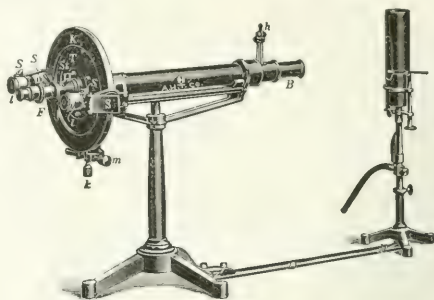
44320. Polariscope, Schmidt & Haensch, with Jellet-Cornu Polarizer and Wedge Compensation, with Direct Reading Linear Scale. For use with ordinary white light such as a petroleum lamp, incandescent lamp, etc. When a 200 mm tube is used the glucose content present in the urine is read directly on the scale to  $\frac{1}{10}\%$ . Where a highly colored specimen of urine is to be examined tubes of 100 mm or 50 mm are to be used, in which case the reading is to be multiplied by 2 and 4, respectively. Complete with one each of patent tubes No. 44552 of 200, 100 and 50 mm length, Petroleum Lamp No. 44516, on adjustable stand with asbestos cylinder as shown in illustration but without case.  
Duty Free..... 87.30      Duty Paid..... 116.40
44324. Polariscope, Schmidt & Haensch, with Jellet Cornu Polarizer and Wedge Compensation, with Direct Reading Linear Scale. Exactly same as No. 44320 but with analyzer and scale in new dust proof mounting and with special Osram electric illuminating device, which serves at the same time to illuminate the scale, with incandescent lamp used as resistance so that connection can be made with ordinary lighting circuit. State voltage in ordering. A most convenient and satisfactory outfit for hospital and other uses where many routine sugar determinations in urine samples are to be made; without case.  
Duty Free..... 119.10      Duty Paid..... 158.80



## Polariscopes for General Purposes, with Divided Circle. For use with Monochromatic Light.

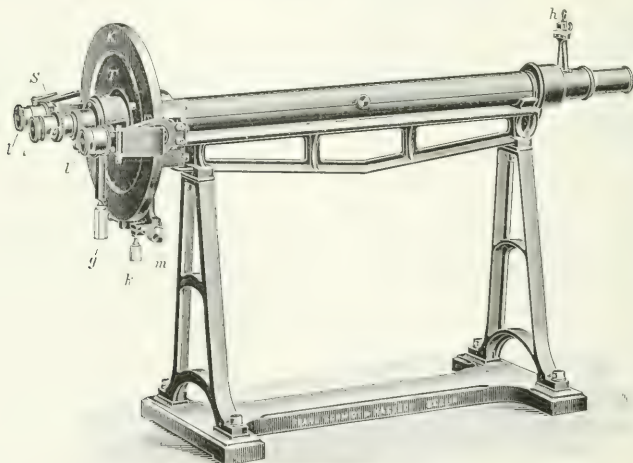


No. 44332



No. 44336

44328. Polariscopes, Mitscherlich, Schmidt & Haensch, exactly the same as No. 44312 but with bichromate cell and tubes of 100 and 200 mm in length instead of the special urine tubes. Reading to  $\frac{1}{10}^{\circ}$  and useful for a variety of work in the investigations of wine, beer, oil, etc., where a great degree of accuracy is not required. With gas sodium lamp with platinum ring. At extra cost a Ventzke degree scale is furnished on these polariscopes. See No. 44356.
- |                |       |            |       |
|----------------|-------|------------|-------|
| Duty Free..... | 59.25 | Stock..... | 79.00 |
|----------------|-------|------------|-------|
44332. Polariscopes, Mitscherlich, with Laurent Polarizer, Schmidt & Haensch, with divided circle reading in single degrees and by means of verniers to  $\frac{1}{10}^{\circ}$ . With illuminating device for the divided circle by means of mirrors, and with bichromate cell and one each patent tubes 100 and 200 mm long, gas sodium lamp with platinum ring. In polished alderwood case with lock and key.
- |                |        |            |        |
|----------------|--------|------------|--------|
| Duty Free..... | 138.60 | Stock..... | 184.80 |
|----------------|--------|------------|--------|
44336. Polariscopes, with Lippich Polarizer, Lippich, Schmidt & Haensch, with divided circle reading in  $\frac{1}{10}^{\circ}$  and by means of verniers to  $\frac{1}{10}^{\circ}$ , with simplified protection and mirror illuminating device for the scale. On tripod support. With new arrangement for connecting the lamp stand to the base of the polariscopes so that it is always in exactly the right position. With bichromate cell, gas sodium lamp, one each of 100, 200 and 220 tubes, in polished alderwood case. Recommended as the most satisfactory outfit for general laboratory work.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 187.50 | Duty Paid..... | 250.00 |
|----------------|--------|----------------|--------|
44340. Polariscopes, same as above, i. e., including lamp, bichromate cell, alderwood case and new lamp arrangement, but for 400 mm tubes, and with one each tubes 100, 200, 220 and 400 mm long.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 200.70 | Duty Paid..... | 267.60 |
|----------------|--------|----------------|--------|

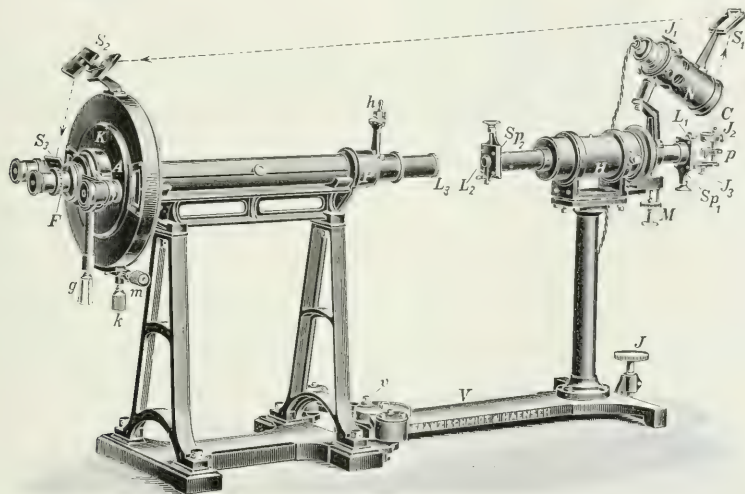


No. 44344

44344. Polariscopes, exactly same as No. 44336, but on trestle support, and without case.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 211.50 | Duty Paid..... | 282.00 |
|----------------|--------|----------------|--------|
44348. Polariscopes, exactly same as No. 44340, but on trestle support, and without case.
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 223.20 | Duty Paid..... | 297.60 |
|----------------|--------|----------------|--------|

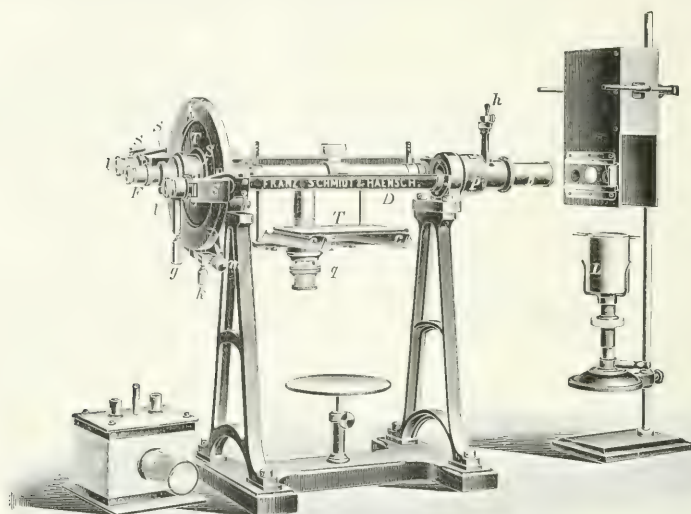
Optional Equipment for Polariscopes, Nos. 44336, 44340, 44344 and 44348.

44352.	Triple Field Polarizing Arrangement for greatly increasing the sensibility as well as the safety and convenience of the adjustment.		
	Duty Free, extra.....	30.00	Duty Paid, extra..... 40.00
44356.	Extra Ventzke Degree Scale in addition to that reading in degrees of arc. The Ventzke scale by means of a third vernier reads to $\frac{1}{10}\%$ of cane sugar.		
	Duty Free, extra.....	12.00	Duty Paid, extra..... 16.00
44360.	Illuminating Device for the verniers consisting of a miniature 6 volt electric lamp in place of the reflecting mirrors.		
	Duty Free, extra.....	9.00	Duty Paid, extra..... 12.00
44364.	Accumulator, three cell, for use with above.		
	Duty Free, extra.....	21.00	Duty Paid, extra..... 28.00
44368.	Glass Case, Folding, for use with instruments with trestle support.		
	For Polariscopes with tubes, mm.....	220	400
	Duty Free.....	15.00	15.90
	Duty Paid.....	20.00	21.20
44372.	Glass Case, with Base Board, for use on instruments with trestle support. See illustration page 431.		
	For Polariscopes with tubes, mm.....	220	400
	Duty Free.....	25.50	27.90
	Duty Paid.....	34.00	37.20



No. 34376

44376.	Polariscope, Schmidt & Haensch, with Lippich Polarizer, for both Macro and Micro Polarisation Experiments. Consisting of Lippich Polariscopes No. 44344, on trestle support with the addition of three diaphragms of different sizes on the polarizer, a direct vision spectroscopic adjustable for all wave lengths and with Nernst lamp for illumination of spectroscopic which also serves to illuminate the mirrors of the scale of the polariscopes. Operating on either direct or alternating current. Voltage must be specified in ordering. Because of the great variety of work for which this instrument is intended no equipment of tubes is included. Without Case.			
	For tubes, mm.....	220	400	600
	Duty Free.....	382.50	391.50	403.50
	Duty Paid.....	510.00	522.00	538.00
44380.	Polariscope, Schmidt & Haensch, Landolt with Lippich Polarizer, with new arrangement for taking not only all kinds of polariscopes tubes but other heating vessels, cooling vessels, electrical devices, etc. The polariscope proper is as described under No. 44344, with trestle support. With adjustment providing for the accurate centering of the optical system at all times. Without Landolt heating device G shown in cut. With special lamp after Landolt. For tubes up to 200 mm in length but without any tubes or case.			
	Duty Free.....	223.80		
	Duty Paid.....		298.40	



No. 44380

44384. Special V Shaped Trough to rest on supports cc for any kind of tubes.  
 Duty Free, extra..... 5.40      Duty Paid, extra..... 7.20
44388. Heating Device, Landolt (G in illustration) consisting of an asbestos jacketed brass vessel with adjustable lid, thermometer reading to 100° C. and a polariscope tube, gold plated inside, 100 mm long set in a glass cylinder.  
 Duty Free, extra..... 19.50      Duty Paid, extra..... 26.00

44392. Electric Heating Device, Abderhalden, for constant temperatures, for use on No. 44380. The use of this device obviates the use of an incubator in the Abderhalden technique. See *Hoppe-Seyler's Zeitschrift für Physiologische Chemie*, Band 84, Heft 4.  
 Duty Free..... 90.00      Duty Paid..... 120.00

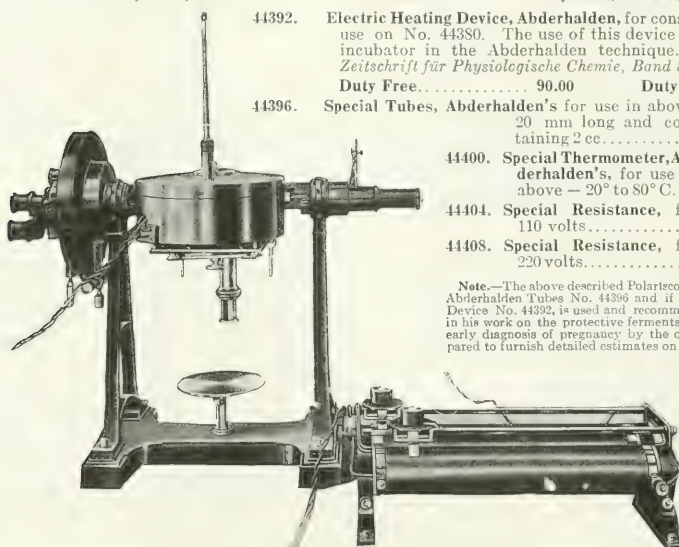
44396. Special Tubes, Abderhalden's for use in above, 20 mm long and containing 2 cc.....  
 Duty Free      Duty Paid  
 3.00      4.00

44400. Special Thermometer, Abderhalden's, for use in above - 20° to 80° C. ..  
 2.25      3.00

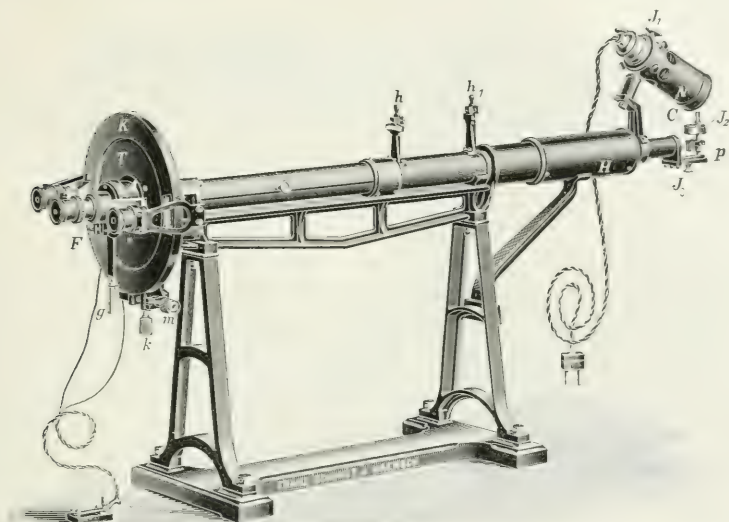
44404. Special Resistance, for 110 volts.....  
 12.00      16.00

44408. Special Resistance, for 220 volts.....  
 15.00      20.00

Note.—The above described Polariscope, No. 44380, with the special Abderhalden Tubes No. 44396 and if desired, the special Heating Device No. 44392, is used and recommended by Prof. Abderhalden in his work on the protective ferments of animal organisms and the early diagnosis of pregnancy by the optical method. We are prepared to furnish detailed estimates on this equipment.



Abderhalden Electric Heating Device No. 44392 in position on Polariscope No. 44380 and with Rheostat

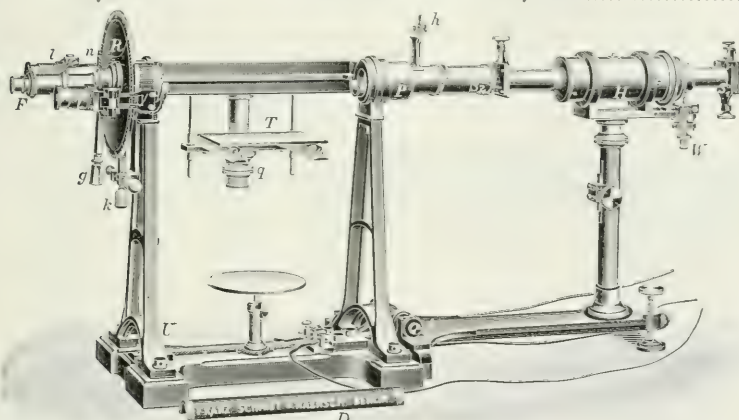


No. 44412

44412. Polariscopes, Schmidt & Haensch, with Lippich Polarizer and Fischer Micro-Polarisation Attachment. On trestle support with direct vision Spectroscope with Nernst lamp illumination. Voltage must be stated in ordering. The spectroscope is permanently adjusted for the D line. With triple field polarizer arranged for the observations of very small fields. Will take ordinary tubes up to 220 mm in length. With one micro tube after Fischer 50 mm long .1 cc content, and one 100 mm long, .2 cc content, but without other tubes or accessories.

Duty Free..... 367.20

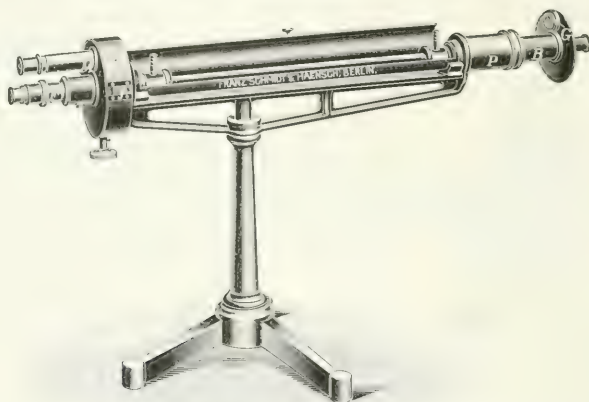
Duty Paid..... 489.60


D  
No. 44416

44416. Polariscopes, Landolt, Schmidt & Haensch, similar to No. 44380 but with the addition of a Direct Vision Spectroscope, but without tubes, case, or source of light for the spectroscope.....
44420. Nernst Lamp Illuminating Apparatus for the above Spectroscope, as shown in illustration of No. 44376. Extra.....
44424. Direct Vision Spectroscope, only, as in above outfit, specially arranged for use with the Polariscopes, mounted on special base.....

Duty Free	Duty Paid
385.50	514.00
27.00	36.00
150.00	200.00



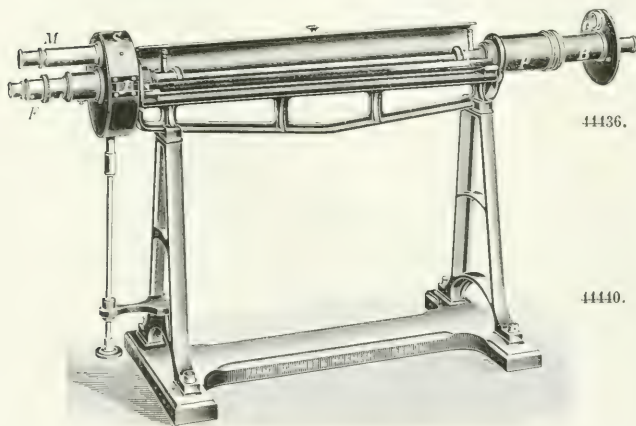


No. 4428

### Polariscopes for Sugar Analysis (Saccharimeters)

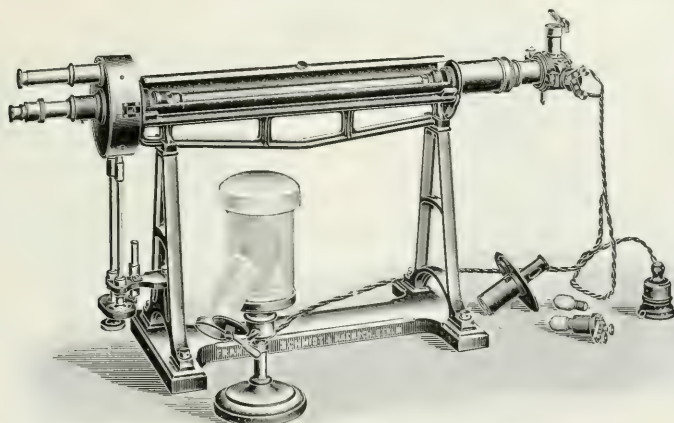
As these instruments are all supplied with either single or double wedge compensation they may be used with white light of any source but the electric illuminating device No. 44476 is specially recommended. All of the outfits are supplied with the bichromate cell as shown attached for use in illustration No. 44428. The scales are graduated in Ventzke degrees for sugar analysis but the instruments may be used for other purposes by using the factor  $1^\circ \text{ Ventzke} = 0.34657^\circ \text{ angular rotation for D}$  by which factor Ventzke degrees are converted into degrees of arc. As regularly listed the instruments are supplied with the double Lippich Polarizer with the triple field Polarizer as optional equipment.

44428. **Polariscope (Saccharimeter) Schmidt & Haensch, with Single Wedge Compensation, with linear scale divided on Nickelin, reading directly from -25 to +100° Ventzke.** With new dust proof mounting for scale and analyzer, double Lippich Polarizer and bichromate cell. For tubes up to 200 mm in length and including one each of patent tubes No. 44552 of 100 and 200 mm length but without lamp. On tripod support as shown in illustration. In polished alderwood case.
- |                |        |            |        |
|----------------|--------|------------|--------|
| Duty Free..... | 142.20 | Stock..... | 189.60 |
|----------------|--------|------------|--------|
44432. **Polariscope, same as above, but for 400 mm tubes, and including one each of No. 44552 patent tubes 100, 200 and 400 mm length, in polished alderwood case.**
- |                |        |                |        |
|----------------|--------|----------------|--------|
| Duty Free..... | 152.10 | Duty Paid..... | 202.80 |
|----------------|--------|----------------|--------|



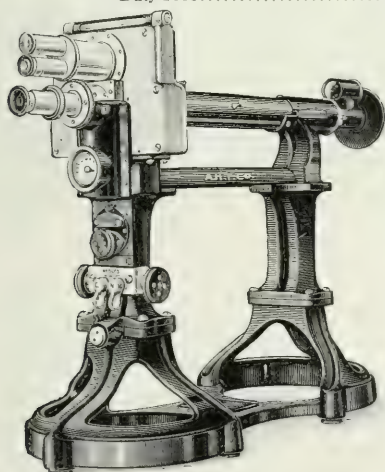
No. 4436

44436. **Polariscope, exactly same as No. 44428, i.e., with 100 mm and 200 mm tubes, but on trestle support and without case.**
- |                |        |
|----------------|--------|
| Duty Free..... | 147.00 |
| Stock.....     | 196.00 |
44440. **Polariscope, exactly same as No. 44432, i.e., with 100 mm, 200 mm and 400 mm tubes, but on trestle support and without case.**
- |                |        |
|----------------|--------|
| Duty Free..... | 156.00 |
| Duty Paid..... | 208.00 |



No. 44452 with 44476 Electric Illuminating Device and Reading Lamp used as Resistance

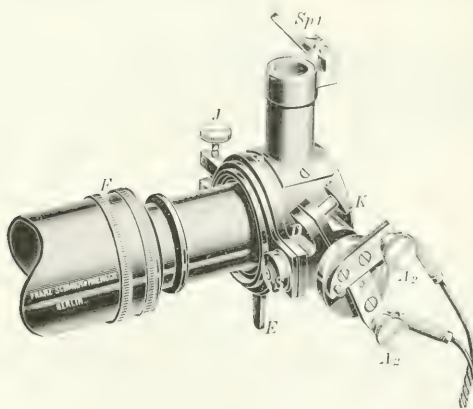
44444. **Polariscope (Saccharimeter), Schmidt & Haensch, with Double Wedge Compensation, and linear scale reading from -100 to +100° Ventzke.** Otherwise same as No. 44428. With one each 100 mm and 200 mm tubes, on tripod support, in polished alderwood case.  
 Duty Free ..... 197.70      Stock ..... 263.60
44448. **Polariscope, same as No. 44444 but for 400 mm tubes, including one each 100 mm, 200 mm and 400 mm tubes, on tripod support, in polished alderwood case.**  
 Duty Free ..... 210.60      Duty Paid ..... 280.80
44452. **Polariscope, same as No. 44444 but on trestle support. Including one each 100 mm and 200 mm tubes but without case.**  
 Duty Free ..... 202.50      Stock ..... 270.00
44456. **Polariscope, same as No. 44448, i.e., for 400 mm tubes, but on trestle support, including one each of 100, 200 and 400 mm tubes, but without case.**  
 Duty Free ..... 217.50      Duty Paid ..... 290.00



No. 44460

44460. **Polariscope (Saccharimeter) Bates, with Double Wedge Compensation, with variable sensibility and brightness (Fric's U. S. Patent, Feb. 12th, 1907). By simply turning a milled head both analyzer and polarizer Nicols are rotated simultaneously through the correct angles to give any desired sensibility and brightness without change of the zero point or other corrections. The half-shadow angle is shown by the "degree of brightness" scale which is in plain view of the operator. This arrangement permits of readings under theoretically perfect conditions. The scales and verniers are etched upon ground glass and read by transmitted light. The objectionable black line between vernier and scale on the metal scales commonly used is thus avoided as well as the expansion coefficient. The scale can easily be interpolated to 0.01° Sugar. Scales read up to a 100° Sugar. Attached to the top of the analyzer case is a horizontal thermometer reading from 10°-40° C., whereby the temperature of the interior of the instrument can be ascertained. For 200 mm tubes. Complete on stand, with one each of 100 and 200 mm tubes, in case..... 850.00**
44464. **Polariscope, Bates, exactly same as above, but for 400 mm tubes. Complete on stand, with one each of 100, 200 and 400 mm tubes, in case ..... 900.00**

44468. **Polariscope Tube, Bates, of metal, with a 9 mm bar to eliminate danger from bending and to give minimum deep polarization from wall reflection. The weight is carried upon two shoulders which are integral parts of the tube, and not upon the caps.**
- |                  |      |      |
|------------------|------|------|
| Length, mm ..... | 100  | 200  |
| Each .....       | 4.00 | 4.00 |



No. 44476

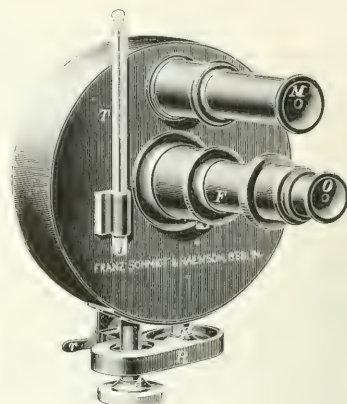
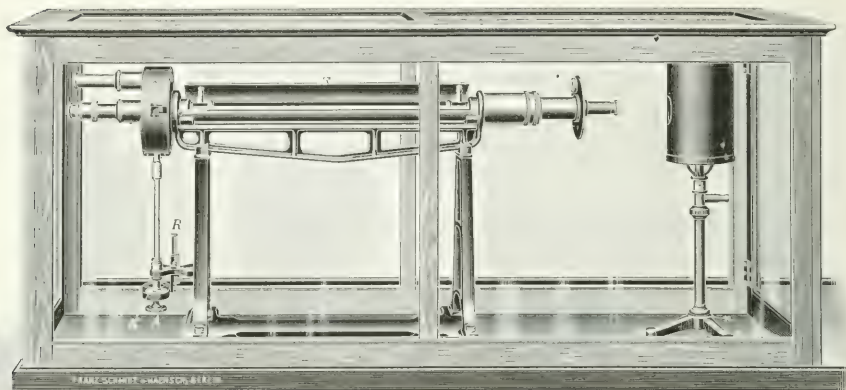


Fig. 13

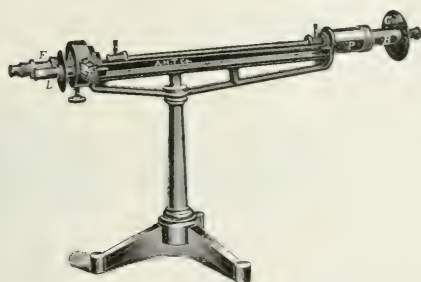
Note.—Fig. 13 illustrates the new arrangement for adjusting quartz wedges whereby one milled head is always protected when the other is exposed. The position of the milled heads in Fig. 13 is that of the instruments with tripod support, while on the instruments with trestle support the milled heads occupy the position shown in No. 44452.



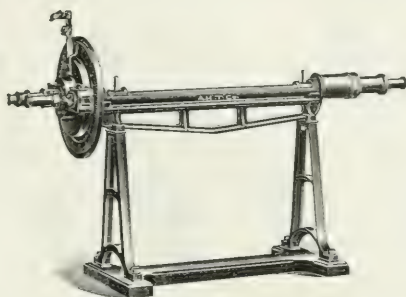
No. 44492

#### Optional Equipment for Sugar Polariscopes. (Saccharimeters.)

44472.	Triple Field Polarizing Arrangement, for greatly increasing the sensibility as well as the safety and convenience of the adjustment. Cannot be attached to an instrument after delivery.		
	Duty Free, extra.....	30.00	Duty Paid, extra..... 40.00
44476.	Electric Illuminating Device, with special Osram lamp. With mirror arrangement for the illumination of the scale, lamp for resistance provided with shade to illuminate note book; adaptable to ordinary lighting circuit. State voltage in ordering. Shown attached in No. 44452.		
	Duty Free, extra.....	40.50	Duty Paid, extra..... 54.00
44480.	Special Tropical Finish, recommended where instruments are to be used in moist and tropical climates, insuring protection to both metal and optical parts.		
	Duty Free, extra.....	4.50	Duty Paid, extra..... 6.00
44488.	Thermometer, in analyzer with projecting stem for convenient reading as in Fig. 13.		
	Duty Free.....	4.50	Duty Paid..... 6.00
44492.	Case, of polished alderwood, with glass sides and base board, for covering the Polariscopes in its working position, with room for lamp. To cover polariscopes taking tubes.....	200 mm 400 mm	
	Duty Free.....	25.50 27.90	
	Duty Paid.....	34.00 37.20	
44496.	Case, Folding, of polished alderwood, with glass sides, for conveniently covering Polariscopes with trestle support in the laboratory. To cover polariscopes taking tubes.....	200 mm 400 mm	
	Duty Free.....	15.00 15.90	
	Duty Paid.....	20.00 21.20	



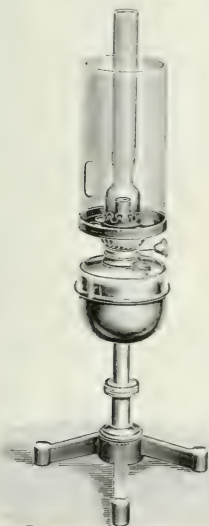
No. 44500



No. 44508

44500. Polariscope (Saccharimeter) for Beet Sugar Investigations, Schmidt & Haensch, with restricted scale reading from 0 to 35° Ventzke, single wedge compensation, for use with white light. With direct reading linear scale engraved on Nickel, with new dust protecting device for analyzer and compensation, and with bichromate cell. On tripod support with two 200 mm tubes, in polished alder-wood case, but without lamp.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 100.20 | Duty Paid | 133.60 |
|-----------|--------|-----------|--------|
44504. Polariscope, exactly same as No. 44500 but on trestle support and without case.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 105.00 | Duty Paid | 140.00 |
|-----------|--------|-----------|--------|
44508. Polariscope, exactly same as No. 44504, but with both circular and linear scales.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 171.00 | Duty Paid | 228.00 |
|-----------|--------|-----------|--------|
44512. Polariscope (Saccharimeter) for Beet Sugar Investigations, Schmidt & Haensch, similar to No. 44500 but with special scale reading from 80 to 100% so that with the use of 400 mm tubes the reading is direct. For 400 mm tubes only. With two 400 mm tubes, but without case or lamp.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 110.10 | Duty Paid | 146.80 |
|-----------|--------|-----------|--------|

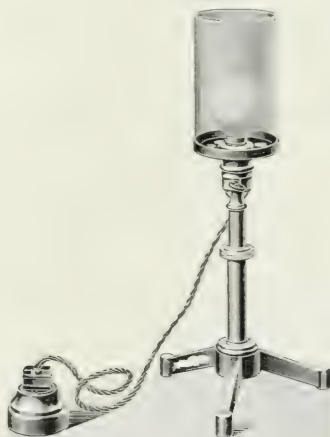
Note.—With the instruments for beet sugar investigations, i.e., No. 44500, 44504, 44508 and 44512 it is recommended that the normal quartz plate No. 44612, for the control of zero, be purchased.



No. 44516



No. 44520

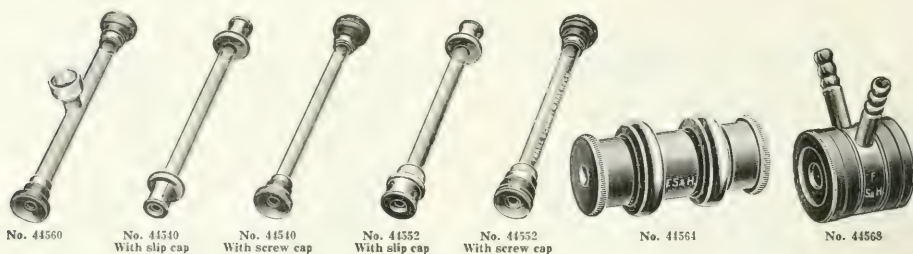


No. 44524

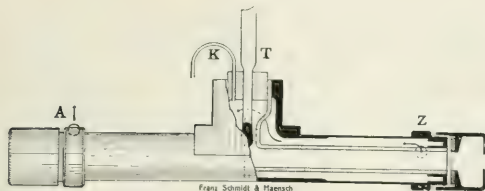
44516. Polariscope Lamp, Schmidt & Haensch, Kerosene, on adjustable stand with asbestos chimney.
- |           |      |       |      |
|-----------|------|-------|------|
| Duty Free | 7.20 | Stock | 9.60 |
|-----------|------|-------|------|
44520. Polariscope Lamp, Schmidt & Haensch, Gas, on adjustable support.
- |           |      |       |      |
|-----------|------|-------|------|
| Duty Free | 7.20 | Stock | 9.60 |
|-----------|------|-------|------|
44524. Polariscope Lamp, Schmidt & Haensch, Electric, on adjustable stand. State voltage in ordering.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 10.80 | Stock | 14.40 |
|-----------|-------|-------|-------|

Note.—The above three lamps are recommended for use with all wedge compensation instruments when the special electric Osram is not used.





44528.	Polariscope Lamp, Schmidt & Haensch, on adjustable stand, with sodium ring to give monochromatic sodium flame. As illustrated in No. 44328 and 44336. With Bunsen burner for gas.						
	Duty Free.....	10.20		Stock.....		13.60	
44532.	Polariscope Lamp, Schmidt & Haensch, Alcohol, with platinum ring for sodium flame.						
	Duty Free.....	12.60		Stock.....		16.80	
44536.	Polariscope Lamp, Schmidt & Haensch, Landolt, Gas, with special Bunsen burner, on adjustable stand, with rectangular chimney and two nickel holders for the sodium chloride, as illustrated in No. 44380.						
	Duty Free.....	13.80		Duty Paid.....		18.40	
44540.	Polariscope Tubes, Schmidt & Haensch, Glass, with either screw cap or slip cap.						
	Length, mm.....	50	94.7	100	189.4	200	220
	Duty, Free.....	2.40	2.40	2.40	2.40	2.40	2.70
	Stock.....	4.00	4.00	4.00	4.00	4.00	4.50
44544.	Extra Glass Tubes only for above						
	For tubes, mm.....	50	94.7	100	189.4	200	220
	Duty Free.....	.45	.45	.45	.45	.45	.50
	Stock.....	.75	.75	.75	.75	.75	.90
44548.	Polariscope Tubes, Schmidt & Haensch, Brass, nickel plated, for either screw cap or slip cap.						
	Length, mm.....	50	94.7	100	189.4	200	220
	Duty Free.....	2.70	2.70	2.70	2.70	2.70	3.00
	Duty Paid.....	3.60	3.60	3.60	3.60	3.60	4.00
44552.	Polariscope Tubes, Schmidt & Haensch, Patent Glass, with enlarged end to take air bubble, with either screw cap or slip cap.						
	Length, mm.....	50	94.7	100	189.4	200	220
	Duty Free.....	2.70	2.70	2.70	2.70	2.70	3.00
	Stock.....	4.50	4.50	4.50	4.50	4.50	5.00
44556.	Extra Patent Glass Tubes, only for above.						
	For tubes, mm.....	50	94.7	100	189.4	200	220
	Duty Free.....	.60	.60	.60	.60	.60	.75
	Stock.....	1.00	1.00	1.00	1.00	1.00	1.25
44560.	Polariscope Tubes, Schmidt & Haensch, Inversion for filling and for thermometer, with either screw cap or slip cap.						
	Length, mm.....	50	94.7	100	189.4	200	220
	Duty Free.....	3.00	3.00	3.00	3.00	3.00	3.45
	Stock.....	5.00	5.00	5.00	5.00	5.00	5.75
44562.	Extra Glass Tubes only for above.						
	For tubes, mm.....	50	94.7	100	189.4	200	220
	Duty Free.....	.90	.90	.90	.90	.90	1.05
	Stock.....	1.50	1.50	1.50	1.50	1.50	1.75
44564.	Polariscope Tube, Micro Tube, Fischer, Schmidt & Haensch.						
	Length, mm.....					50	100
	Contents, cc.....					0.1	0.2
	Duty Free.....					3.60	3.60
	Duty Paid.....					4.80	4.80
44568.	Polariscope Tube, Abderhalden, Schmidt & Haensch, 200 mm long, containing 2 cc, with water jacket.						
	Duty Free.....		7.20				
	Duty Paid.....						9.60



No. 44572



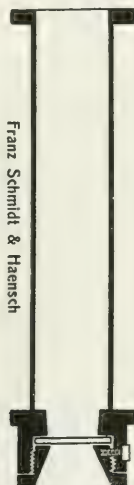
No. 44576



No. 44580



No. 44588



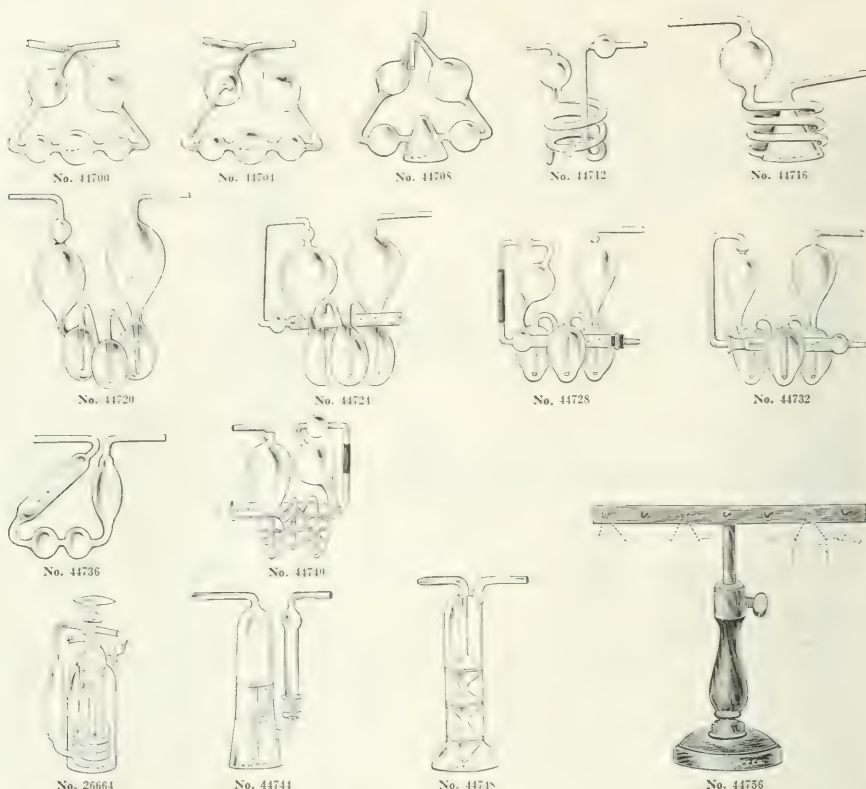
No. 44608

44572.	Polariscopes Tube, Inversion, Landolt, Schmidt & Haensch, for general scientific work, of glass, with brass water jacket thermometer tubulation, etc., including thermometer graduated from 10 to 32° C. in $\frac{1}{10}$ ths.	50	100	200	220	400	600
	Duty Free.....	12.00	12.00	12.60	12.90	13.50	14.40
	Duty Paid.....	16.00	16.00	16.80	17.20	18.00	19.20
44576.	Polariscopes Tube, Inversion, Schmidt & Haensch, with brass water jacket, tubulation for thermometer, etc., but without thermometer.						
	Duty Free.....			100	200	400	600
	Duty Paid.....			6.00	6.30	7.20	8.10
	Duty Paid.....			8.00	8.40	9.60	10.80
44580.	Polariscopes Tube, Pellet, Schmidt & Haensch, arranged for continuous flow of liquid to be observed.						
	Duty Free.....			100	200	400	600
	Duty Paid.....			5.70	5.70	6.00	6.90
	Duty Paid.....			7.60	7.60	8.00	9.20
44584.	Polariscopes Tube, same as above but with funnel and gauge tube.						
	Duty Free.....			100	200	400	600
	Duty Paid.....			9.00	9.00	9.30	10.20
	Duty Paid.....			12.00	12.00	12.40	13.60

Note.—The above Duty Free prices given on Polariscopes Tubes can only be extended when the tubes are imported in connection with a complete outfit.

44588.	Polariscopes Control Tube, Schmidt & Haensch, of brass. Complete in case.						
	Duty Free.....	36.00					
	Duty Paid.....						48.00
44592.	Cover Glasses, 15.5 mm of optically inactive glass, diameter, for the regular polariscopes tubes, per dozen.....						1.50
44596.	Cover Glasses, 23.7 mm diameter, for the patent tubes and the Inversion tubes, per dozen.....						2.25
44600.	Cover Glasses, 26.2 mm diameter, for the Abderhalden tubes, per dozen.....						2.00
44604.	Rubber Rings, for use between above cover glasses.						
	For cover glasses, mm in diameter.....			15.5	23.7		26.2
	Per dozen.....			.25	.30		.35
44608.	Polariscopes Test Plate of quartz, optically pure, for testing the scale anywhere between 25° and 100° Ventzke either right or left.						
	Duty Free.....	10.50					14.00
	Stock.....						
44612.	Polariscopes Test Plate of quartz, optically pure, for testing the scale from -25 to +25° Ventzke. Designed especially for use with Polariscopes, No. 44512.						
	Duty Free.....	15.00					20.00
	Duty Paid.....						
44616.	Polariscopes Test Plates, set of 5 in accordance with the "Internationalen Kommission für einheitliche Untersuchungsmethoden." In case.						
	Duty Free.....	60.00					80.00
	Duty Paid.....						

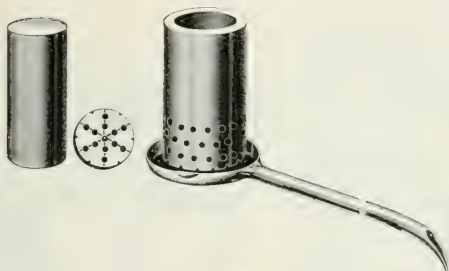
Note.—The above set of Test Plates, No. 44616, is furnished with certificate of the Physikalisch-Technische Reichsanstalt at extra price when so ordered.



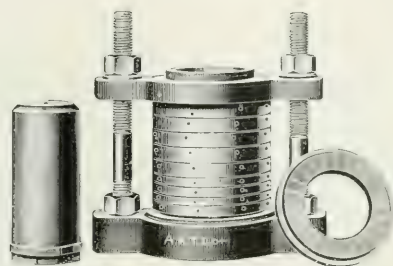
44700.	Potash Bulb, Liebig, with five bulbs.....	.50
44704.	" " Liebig-Dittmar.....	.75
44708.	" " Liebig-Kyll.....	.75
44712.	" " Winkler. Height, mm.....	100 1.80
	Each.....	.80 1.25
44716.	Potash Bulb, Winkler-Kyll.....	1.30
44720.	" " Mohr.....	.80
44724.	" " " with $\text{CaCl}_2$ tube.....	1.00
44728.	" " " " with rubber connections.....	1.20
44732.	" " " " " ground in.....	1.25
44736.	Potash Bulb, Norris.....	.50
44740.	" " Geissler-Wetzel, with a ball float valve in each of the lower bulbs.....	1.75
26664.	" " and Drying Tube Combined, Vanier. (See Vanier Combustion Train p. 150).....	3.25
44744.	" " Gomberg, with ground in side tube.....	1.50
44748.	Potash Bulb, Bowen, for very thorough absorption. Size.....	Small Large
	Each.....	1.50 2.00
44756.	Potash Bulb Support, of wood, adjustable as to height.....	1.50

We devote over eight thousand sq. ft of floor space to our salesroom and offices, maintaining a permanent exhibit of Laboratory Apparatus amounting to over six thousand different pieces, conveniently arranged for the inspection and handling by our visitors, and a dark room for the demonstration of Projection and Micro-Photographic Apparatus.

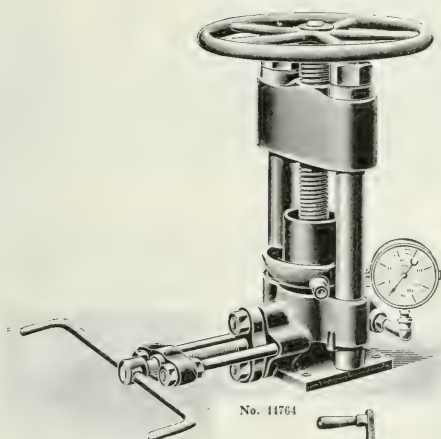
We recommend that customers visit our establishment when possible before the preparation of equipment lists and use this facility we provide for the careful selection of apparatus.



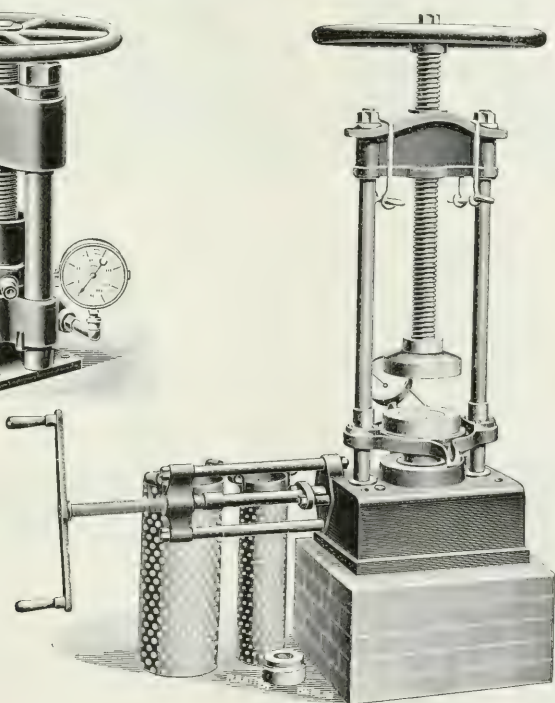
No. 44768



No. 44772



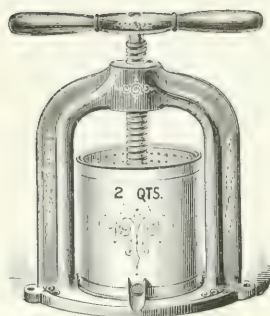
No. 44764



No. 44760

44760. Press, Hydraulic, Büchner for 300 atmospheres pressure, with two cylinders of perforated tin, one 118 mm in diameter by 500 mm high, with a capacity of about 5 liters, and the larger one 200 mm by 500 mm with a capacity of about 15 liters.  
Duty Free..... 205.00      Duty Paid..... 245.00
44764. Press, Hydraulic, of the same general construction as the large press after Büchner but of smaller dimensions and for very high pressures, i. e., 600 atmospheres.  
Duty Free..... 128.75      Duty Paid..... 155.00
44768. Cylinder, Abderhalden, for use with the above presses, consisting of a perforated metallic cylinder, 55 mm in diameter, with removable bottom and piston, with collecting tray and spout.  
Duty Free..... 14.85      Duty Paid..... 17.85
44772. Cylinder, Meyer, for use with the above presses, consisting of ten heavy, accurately fitting, metallic rings, 70 mm in diameter. See *Archiv f. exp. Path. u. Pharmacologie*, Bd. 47, pag. 426.  
Duty Free..... 33.00      Duty Paid..... 40.00

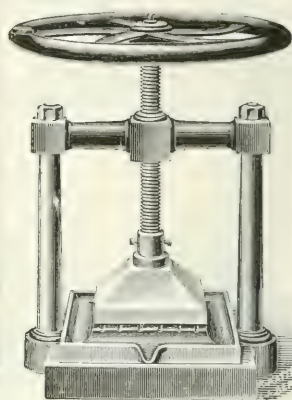




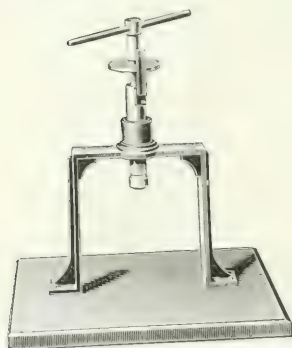
No. 44776



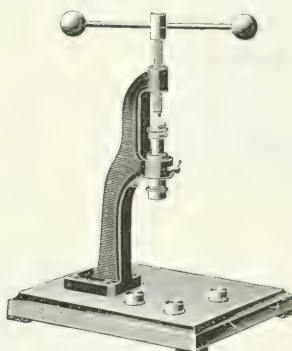
No. 44780



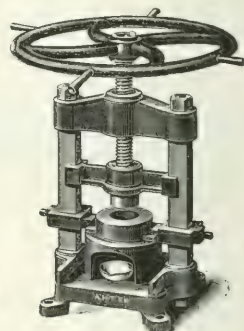
No. 44784



No. 44788



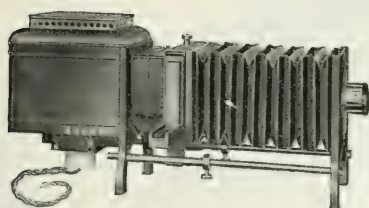
No. 44792



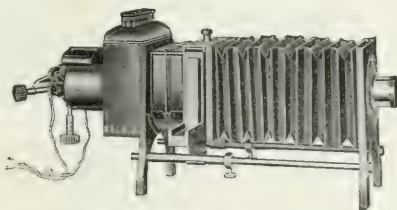
No. 44796

44776. Press, Tincture, extra heavy, for making tinctures, decoctions, infusions, etc.  
Capacity, quarts..... 1 2 4 8  
Each..... 3.75 4.50 6.50 10.00
44780. Press, Laboratory, for use where material must not be in contact with metal. exposed parts being made of porcelain; diameter of press plate, 80 mm..... 17.00
44784. Press, Laboratory, Witt, with porcelain plates, the lower one with trough and with pressing surface 150 mm square. Very heavily built to withstand strong pressure.  
Duty Free..... 33.00 Duty Paid..... 40.00
44788. Press, Sodium, Kossel, for the direct preparation of  $\frac{1}{10}$  Normal solutions without weighing of the sodium. See *Hoppe-Seyler, Zeitschr. f. physiologische Chemie, Bd. 33.*  
Duty Free..... 21.00 Duty Paid..... 25.20
44792. Press, Sodium, Hofmann, with separate removable cylinder for producing both wire and ribbon. With molds for wire of  $\frac{1}{4}$ ,  $\frac{1}{2}$ , 1 and 2 mm diameter and ribbon of 0.4 by 10 mm..... 17.50
44796. Press, Laboratory, for sugar beet samples, cylinder 60 mm diameter with fine perforations through which the juice is pressed into the dish shown below.  
Duty Free..... 40.50 Duty Paid..... 54.00

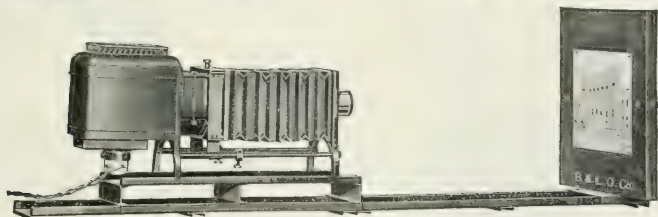
# PROJECTION APPARATUS



No. 44800—Model B with Mazda Lamp



No. 44804—Model B with Body Arc



No. 44820—Enlarging Outfit

**PROJECTION APPARATUS, BAUSCH & LOMB MODEL B BALOPTICON.** This little Balopticon is a high grade stereopticon for use in small classrooms, etc.

We furnish the Model B with either small arc lamp and compact rheostat or with the new 250 Watt nitrogen filled Mazda Lamp with silvered globe and concentrated filament. This new illuminant gives almost as brilliant a picture with lantern slides as does the arc lamp on direct current circuit and quite as brilliant as the arc lamp on alternating circuit. It is strongly recommended for school and home work where apparatus is to be operated by those not familiar with the manipulation of even a simple arc lamp. Both are furnished complete with connections for ready attachment to the lamp socket on any ordinary house wiring. Where electricity is not available, we furnish either an acetylene or Welsbach gas burner. If both types of illuminant are desired, we can supply the extra lamp in its lamp house for quick and easy interchange.

A feature of this lantern is the special ventilation of both lamp house and condenser mount, permitting one to use lantern slide films, if desired, without the expense and inconvenience of a water cell.

**Lamp House**—Of sheet metal with special ventilation; two styles—one for arc lamp measuring  $6\frac{1}{2} \times 2\frac{1}{2} \times 5$  in., and that for Mazda, acetylene or Welsbach lamp measuring  $6\frac{1}{2} \times 7 \times 5$  in.; both styles fit in grooves to rear standard and can be instantly interchanged by lifting out one and sliding in the other.

**Illuminant**—Bausch & Lomb Adjustable Baby Arc Lamp with small 4 $\frac{1}{2}$ -ampere rheostat, 250-watt Mazda lamp, nitrogen filled with silvered globe, acetylene or Welsbach gas burner, as desired; carbons of arc lamp can be adjusted independently and then very easily fed forward by turning a single convenient button.

**Projection Lens**—Special achromatic lens of 10-inch focus in spiral focusing mount regularly supplied; either 8-inch or 12-inch focus lens can be furnished, by special order, without extra charge.

**Dimensions**—Length (ready for operation), 20 in. over all, with arc, or 22 in. with other lamps; height, 9 $\frac{1}{2}$  in.

**Weight**—Complete in case, 15 lbs. with arc and rheostat, or 13 lbs. with other lamps.

**Case**—Of sheet metal,  $7\frac{1}{2} \times 9\frac{1}{2} \times 15$  in., neatly lacquered in black and provided with carrying strap.

44800.	Model B Balopticon, as above described, with 250-watt Mazda lamp, cord and plug, in case, with directions.....	22.00
44804.	Model B Balopticon, with arc lamp, rheostat and switch.....	24.00
44808.	“ “ “ with Welsbach gas burner and connections.....	20.00
44812.	“ “ “ with acetylene burner.....	20.00
44813.	Acetylene Tank (Prest-o-lite), charged with 10 cu. ft. of Acetylene.....	10.00
44820.	Lantern Slide and Enlarging Outfit, for use in connection with Model B Balopticon, consisting of the following:—	

- Two sections of metal track, each 24 in. long, to be screwed to table or baseboard.
- Easel board, accommodating 11 x 14-in. paper either vertically or horizontally and mounted at one end of track.
- Supplementary track, 18 in. long, sliding on base tracks and supporting the Balopticon at suitable height to align optical axis with center of board.
- Special holder with two pieces of glass to accommodate films for enlarging, up to 4 x 5 in.
- Frame to hold negatives for lantern slide making, 5 x 7 in. and smaller sizes.
- Adapter with ground glass, attaching to rear of easel board to accommodate regular lamp house of Balopticon.
- Special frame, fitting in slide carrier support to take ground glass and plate holder.
- Piece of ground glass to place between condensing lenses when arc lamp is used.
- Cap with ruby glass to place on projection lens when placing sensitized paper on easel.

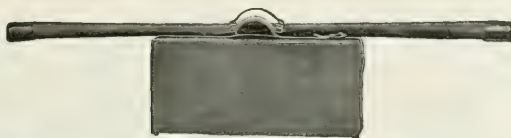
Complete outfit, as above..... 18.00

44824.	Flange, for use when it is desired to use photographic lens from the camera, same to be attached to the front board of the Balopticon. Make and size of the photographic lens must be specified in ordering.....	2.00
--------	--	------

**Note**—For small enlargements the regular 10-inch e. f. projection objective supplied with the Model B is satisfactory. For larger work a shorter focus lens is recommended such as the 6-inch regular projection objective.



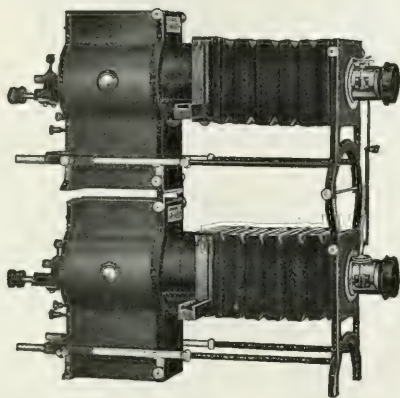




No. 44876—Portable Model C in Case with Screen



No. 44876—Portable Model C with Tripod, Case and Acetylene Tank



No. 44868—Model C Dissolving

**PROJECTION APPARATUS, BAUSCH & LOMB DOUBLE MODEL C FOR DISSOLVING EFFECT**, with Bausch & Lomb patent iris diaphragm dissolver, which affords a perfect blending of one picture into the other. With the exception of the iris dissolver the outfits are standard Model C but when ordered together are furnished with the necessary connecting pieces to rigidly join them together.

44868. Double Model C Balopticon, with 6, 8 or 10-inch focus,  $1\frac{1}{8}$  inch diameter projection lens, as specified, with iris dissolver..... 75.00
44872. Double Model C Balopticon, with 10, 12 or 15-inch focus,  $2\frac{1}{8}$  inch diameter projection lens, as specified, with iris dissolver..... 85.00

**PROJECTION APPARATUS, BAUSCH & LOMB PORTABLE MODEL C**, as widely used by members of the staff of Agricultural Experiment Stations in their field work, Farmers Institute work, etc., and as supplied by us to all of the field lecturers employed by the Rockefeller Sanitary Commission for the Eradication of the Hookworm.

**Lantern**—Bausch & Lomb regular Model C Balopticon, fitted with  $2\frac{1}{4}$ -inch diameter, 10-inch focus Standard projection lens and double condensing system in patent ventilated mount.

**Illuminant**—Acetylene lamp of two-jet type with capacity of  $1\frac{1}{2}$  cubic feet of gas per hour; fitted with special mirror reflector.

**Supporting Table**—Consists of strong tripod, adjustable to any desired height, with connection for screwing firmly into cover of carrying case, which forms the top.

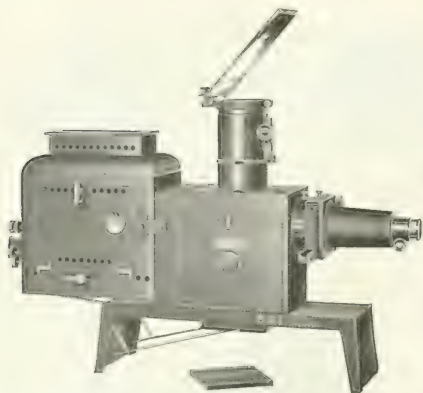
**Carrying Case**—Of wood, measuring  $29\frac{1}{2} \times 13\frac{1}{2} \times 8\frac{1}{2}$  in., covered with leather; cover is detachable, asbestos lined and fitted with neat metal plate into which tripod is screwed; case is carried by strong handle attached to heavy leather strap and, in addition to the regular outfit, contains space for gas tank of 10 cubic feet capacity and a second illuminant, both of which may be added at extra cost.

**Weight**—Outfit in case, with gas tank added, 40 lbs.

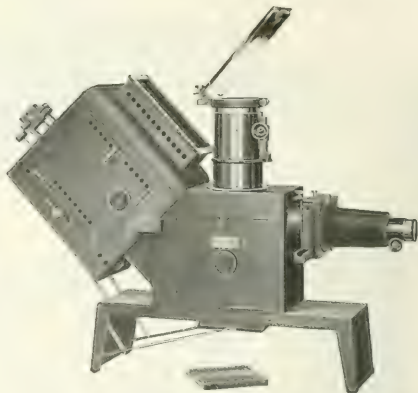
**Suggested Accessories**—Wherever electric wiring is available, an electric illuminant, particularly the arc lamp, is preferable, and it is well to be provided with one in addition to the acetylene lamp. They will be found listed elsewhere. For those desiring a portable screen we list below a 6 x 6-foot screen of heavy material on a plain roller. It is furnished in a canvas covered case with reinforced leather ends, which is fitted with a serviceable handle for carrying with the outfit, the whole weighing but 4 lbs.

44876. Portable Model C Balopticon, as above described..... 45.00
44880. " Screen, 6 ft. square, on plain roller in canvas covered case with reinforced leather ends. 8.00
44884. Acetylene Gas Tank, 10 cu. ft. capacity..... 10.00





No. 44855. Combined Balopticon in position for projection of lantern slides



No. 44857. Combined Balopticon in position for projection of opaque objects without reversion of image

**PROJECTION APPARATUS, BAUSCH & LOMB COMBINED BALOPTICON, NEW MODEL,** providing for lantern slide projection and projection of opaque objects with immediate interchange from one to the other. The new model differs from the earlier model of the Combined Balopticon in that it is now provided with a horizontal object holder for opaque objects which has been found in the Universal and Convertible models to be distinctly better than the vertical object holder and, further, that opaque projection is accomplished with the object on the screen in the correct position from left to right, i.e. without reversion of the image. This is accomplished by illuminating the opaque object directly from the arc by placing the lamp house in the inclined position so that the image projected vertically through the opaque projection objective is reflected horizontally to the screen by the mirror over the opaque object. Lantern slides are projected with the lamp house in the horizontal position and the change from the projection of lantern slides to opaque projection, or vice versa, is accomplished by the simple shifting of the lamp house from the horizontal to the vertical position as shown in the illustration. The size of the area which may be projected through the opaque projection objective is 5 x 5 inches and the object holder is so constructed that large illustrations can be shifted about to cover any desired area for projection. For convenience in handling photographic plate and post cards two carriers are supplied with adjustable frames to take cards of varying width.

**Base**—Consisting of heavy sheet metal supports, front and rear, 8 inches wide, and carrying dark chamber at height of 9½ inches.

**Lamp House**—Measures 13½ inches long, 14½ inches high and 7½ inches wide; light tight and freely ventilated, constructed of double sheet metal walls with an air space between the two walls and the roof, fitted with special patented ventilator; with large light tight spring door on the side and observation windows on both sides; mounted between horizontal supports at front end and provided with handle at rear, permitting it to be easily tilted for projection of opaque objects and held rigidly in position by spring arm; conforms to the most rigorous requirements of Boards of Underwriters.

**Illuminant**—Hand-feed arc lamp for direct or alternating current.

**Condensing System**—Bausch & Lomb regular triple system, with two rear lenses mounted directly in front of the lamp house in ventilated mount, giving a parallel beam of light in the dark chamber, and the front lens placed in front of the dark chamber immediately behind the slide carrier; diameter 4½ inches.

**Dark Chamber**—Of sheet metal, light tight, measuring 12½ x 11½ x 7 inches; with opening in bottom for projected objects 5 inches square; provided with hinged door and observation window on right side.

**Object Holder**—Of square sheet metal mounted on arm controlled by two strong springs; accommodating objects of varying thickness, the holder always remaining parallel to base and automatically bringing object into proper plane of projection.

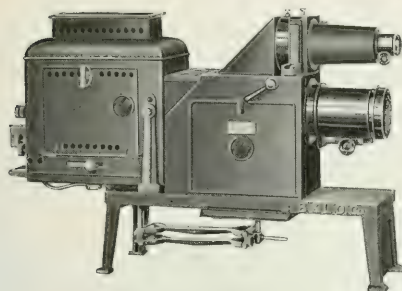
**Slide Carrier**—Double carrier with elevating device.

**Post Card Carrier**—Two adjustable carriers with wooden backs and frame which fit opaque object holder.

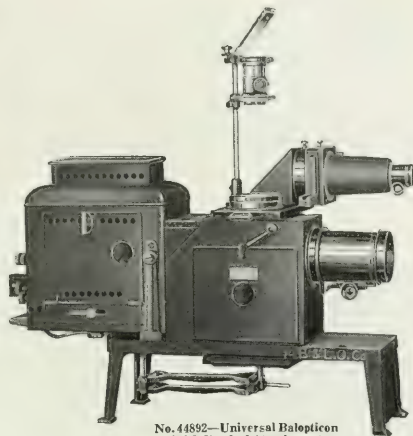
**Projection Lenses**—Two of Bausch & Lomb new standard lenses with rack and pinion focusing adjustment, of such relative foci as to project images of approximately equal size from opaque objects and lantern slides; lens for opaque objects fitted with adjustable first surface mirror.

**Dimensions**—Length from rear of lamp house to front of projection lens for lantern slides; height to top of mirror 33 inches.

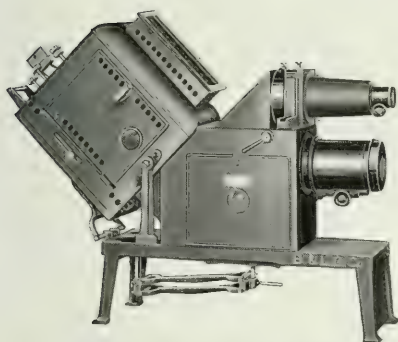
44855. New Combined Balopticon, as above, with 4 inch diameter, 15 inch focus lens for opaque projection and 1½ inch diameter, 10 inch focus lens for lantern slide projection; without rheostat... 120.00
44856. New Combined Balopticon, as above, but with 18 inch focus lens for opaque projection and 12 inch focus lens for lantern slide projection... 120.00



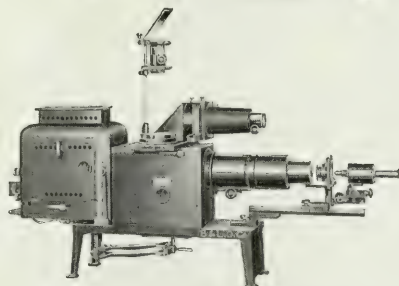
No. 41888—Universal Balopticon



No. 44892—Universal Balopticon  
With Vertical Attachment



No. 41888 in Position for Opaque Projection



No. 44892 With Projection Microscope

**PROJECTION APPARATUS, BAUSCH & LOMB UNIVERSAL BALOPTICON, New Model,** providing for lantern slide projection, opaque object projection by reflected light from an area 6x6 inches, micro projection, and projection of objects in a horizontal position by transmitted light with the use of vertical attachment.

The interchange from lantern slide projection to projection of opaque objects is instantaneous without taking down or building up any part of the apparatus. With the vertical attachment in position the change is made instantly from opaque projection to either vertical or lantern slide projection. When the projection microscope is in position the change from micro projection to either lantern slide, vertical projection or opaque is instantaneous.

**Base**—Of cast iron, 25 in. in length; carried at height of 7 in. from table by two cast iron supports of 11-in. spread with elevating screws front and rear.

**Lamp House**—Measures 13½ in. long, 13½ in. high and 7½ in. wide, light-tight and freely ventilated, constructed of double sheet metal walls, with an air space between the two walls and the roof fitted with B. & L. special patented ventilator; provided with large, light-tight spring door on the side and observation windows on both sides; mounted between uprights in front end and provided with handle at rear, permitting it to be easily tilted for opaque projection and held rigidly in position by strong spring arm; conforms to the most rigorous requirements of Boards of Underwriters.

**Illuminant**—Hand-feed arc lamp for direct or alternating current.

**Condensing System**—Consists of two rear lenses of B. & L. triple system, 6-in. diameter, in ventilated mount directly in front of lamp house, rendering light approximately parallel in dark chamber, and a plano-convex lens placed in front of the mirror box for lantern slide work, completing triple system.

**Object Holder**—Round, of heavy metal, mounted on double arm with spring hinge at each end and handle at holder end; the whole adjustable for height on a grooved vertical standard and provided with set screw; will accommodate objects of widely varying thickness and size, the holder always remaining parallel to base and automatically bringing object into proper plane of projection; dark curtain in front of opening prevents light from flooding room when object is being changed.

**Mirror Box**—Of sheet metal, prism shape and light-tight; mounted over opening in top of dark chamber and containing stationary mirror at suitable angle to reflect beam of light through lantern slide.

**Projection Lenses**—Two Bausch & Lomb Standard lenses with rack and pinion focusing adjustment, that for lantern slides regularly of 8-inch focus, 1½-in. diameter, and that for opaque work of 15-inch focus, 4-in. diameter; lenses of other foci may be substituted if so specified.

**Dimensions**—Length over all, 38 in.; height, 24 in.

**Vertical Equipment**—Regularly furnished with Universal Balopticon No. 348/2 only, but can be ordered separately and easily added to No. 34888; consists of a rectangular metal plate, 6½ x 12 in., with circular opening at either end; over one end is mounted a plano-convex condensing lens with plane side up, to complete triple condensing system for vertical projection and provide stage upon which to work; upright grooved standard near opening carries 10-in. focus, 1½-in. diameter projection lens and mirror for vertical work; over other opening provision is made for mounting mirror box with lantern slide equipment; for quick transformation from one form of projection to the other entire plate slides on metal rods and is operated by convenient handle.

**Possible Attachments**—The medium microscope, or large microscope, and any standard moving picture attachment can be used successfully with this Balopticon.

**Price List** on following page.

## Universal Balopecton (Continued)

44888.	Universal Balopecton, as described above, with 15-inch focus, 4-inch diameter lens for opaque objects and 8-inch focus, 1½-inch diameter lens for lantern slides, without vertical equipment.....	160.00
44892.	Universal Balopecton, as above, but with vertical attachment.....	175.00
44896.	" " " " " " " " 18-inch focus, 4-inch diameter lens for opaque objects and 10-inch focus, 1½-inch diameter lens for lantern slides.....	160.00
44900.	Universal Balopecton, as above, with vertical attachment.....	175.00
44904.	Vertical Equipment, only, with mounting for attachment to dark chamber of No. 34888.....	15.00
44908.	Optical Bench, carefully planed, 15 inches long, for attaching to the front end of the base of Universal Balopecton to accommodate projection microscope.....	5.00

**PROJECTION APPARATUS, BAUSCH & LOMB CONVERTIBLE, New Model,** providing for lantern slide projection, projection of opaque objects by reflected light from an area 8x8 inches, micro projection, projection of large and transparent objects, such as liquids or X-ray plates from a horizontal position, polariscope projection, micro-polariscope projection, spectroscopy projection, etc.

In opaque projection diaphragms are supplied reducing the area projected to 6 inches square and 4 inches square. The use of these permits the withdrawal of the arc from the condenser systems, thus providing increased illumination, etc.

**Base**—Cast iron frame of rectangular shape, 13 in. wide, with rigid supports at either end carrying dark chamber and optical bed at height of 10 in.

**Optical Bed**—Of lathe type, carefully planed, accommodating supports for attachments which may be adjusted as desired and rigidly clamped; length of optical bed proper, 22 in.; entire bed, including space occupied by dark chamber, 42 in. long, affording wide range of applicability.

**Lamp House**—Measures 13½ in. long, 13½ in. high and 7½ in. wide; light-tight and freely ventilated, constructed of double sheet metal walls, with an air space between the two walls and the roof fitted with Bausch & Lomb special patented ventilator; provided with large, light-tight spring door on the side and observation windows on both sides; mounted between uprights at front end and provided with handle at rear, permitting it to be easily tilted for opaque projection and held rigidly in position by strong spring arm; conforms to the most rigorous requirements of Boards of Underwriters.

**Illuminant**—Hand-feed arc lamp for direct or alternating current, connected by two feed wires to a switch attached to rear of base and provided with magnetic coils to minimize "blowing."

**Condensing System**—Bausch & Lomb regular triple system, with the two rear lenses of 6 and 8-inch diameter mounted directly in front of the lamp house in special ventilated mount, giving a parallel beam of light in the dark chamber, and the front lens of 4½-inch diameter placed in front of the dark chamber immediately behind the slide carrier.

**Dark Chamber**—Of metal, light-tight, measuring 17 x 11 x 8 in.; with opening in bottom for projected objects, 8 in. square, and metal diaphragms to give 6-in. square or 4-in. square opening, as desired; provided with hinged door and observation window on right side; contains movable mirror so mounted as to prevent flooding screen with light in changing from one form of projection to another—also small condensing lens in swinging mount for use in high power microscope projection.

**Object Holder**—Square, of heavy metal, mounted on double arm with spring hinge at each end and handle at holder end; the whole adjustable for height on a grooved standard and provided with set screw; will accommodate objects of widely varying thickness and size, the holder always remaining parallel to base and automatically bringing object into proper plane of projection; curtain at front of base prevents light from flooding room when object is being changed, while sliding velvet curtains on either side screen light when large objects are in place.

**Projection Lenses**—Standard or Tessar, according to the outfit ordered; one for lantern slides and one for opaque projection, the latter provided with large first surface, adjustable reversing mirror.

**Dimensions**—Length, back of lamp house to front end of bed, 53 in.; height, 27 in., to top of lens for opaque projection.

**Microscope Attachment**—Consists of Large Projection Microscope, including amplifier, new projection eyepiece, substage water cell, three substage condensers, triple revolving nosepiece and three diaphragms for use in slide carrier; mounted on swinging arm which attaches to optical bed.

**Vertical Attachment**—Consists of dark chamber, 8 x 5½ x 5 in., with movable mirror which can be set to direct light through 4½-inch diameter plano-convex condensing lens in horizontal mounting over opening in top of chamber; 11-in., upright optical bed on top of chamber carries two standards supporting bellows and 10-in. focus, 1½-inch diameter projection lens with adjustable reversing mirror; is also supplied for holding microscope in vertical position, in which case a reversing prism is included.

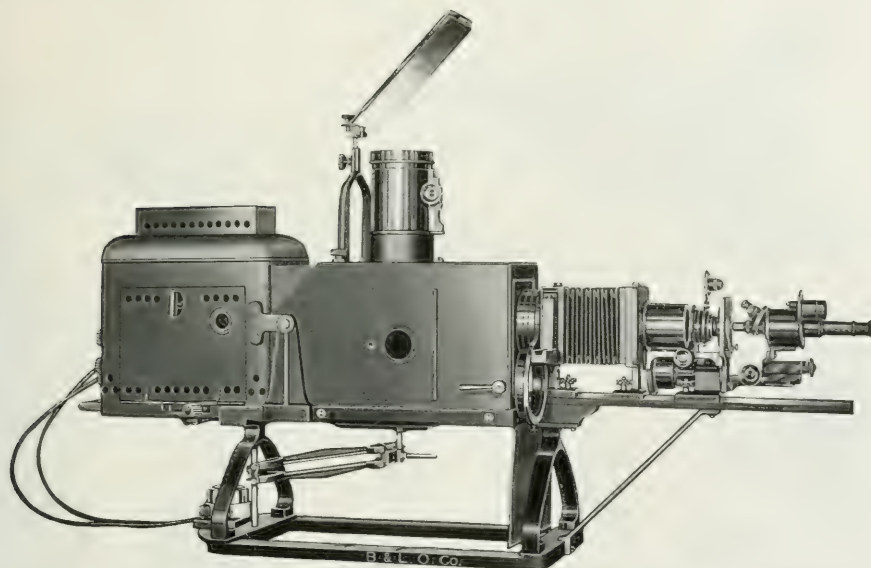
**Combined Polariscope and Vertical Attachment**—Consists of Vertical Attachment complete, as described above, with a Delezenne polarizer which fits over the opening in top of dark chamber and has two rotating quarter-wave mica plates in front; 11 in. horizontal optical bed clamps readily to front of chamber and carries polariscope parts, consisting of strongly convergent and divergent lenses, mounted in connection with a 95-mm diameter revolving stage, a 4-in. focus objective and a revolvable Nicol prism as analyzer, the objective and analyzer being mounted for focusing by a rack and pinion adjustment.

**Special Vertical Attachment**—Consists of a dark chamber, 9½ x 8½ x 8½ in., with an 8-in. diameter plano-convex condensing lens in horizontal mounting over opening in top, surrounded by cloth-covered platform 14 x 12 in.; upright standard, 12 in. high, carries 13-in. focus, 2½-inch diameter projection lens with first surface, adjustable reversing mirror, the whole being mounted on swinging arm which permits it to be swung out of path of light for opaque projection.

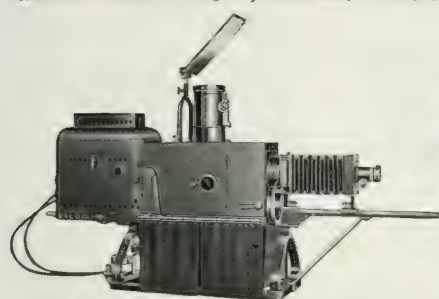
We particularly recommend the Convertible Balopecton with large Projection Microscope where projection with the higher powers is to be accomplished and where immediate interchange from micro projection to either lantern slide or opaque objects is desirable. The special vertical attachment provided with this outfit is the best method available for the projecting of X-ray plates, large histological subjects, such as of the brain, and other transparencies, without reducing them to ordinary lantern slides as this special attachment provides for the projection of areas up to 8 inches in diameter.

44912.	Convertible Balopecton, complete for projection of lantern slides and opaque objects, with 15-inch focus, 4-inch diameter lens for opaque objects and 8-inch focus, 1½-inch diameter lens for lantern slides.....	250.00
44916.	Convertible Balopecton, same as above, but with 18-inch focus 4-inch diameter lens for opaque objects and 10-inch focus, 1½-inch diameter lens for lantern slides.....	250.00
44920.	Convertible Balopecton, same as above, but with 15½-inch focus, 3½-inch diameter Tessar Ic lens for opaque objects and 8-inch focus, 1½-inch diameter Standard lens for lantern slides.....	430.00
44924.	Set of Accessories for projection of 4 x 5 or 5 x 7 transparencies, consisting of special slide carrier support, double-slide carrier, 8-inch diameter, 15-inch focus plano-convex condensing lens, tapering bellows and front standard, without projection lens.....	30.00

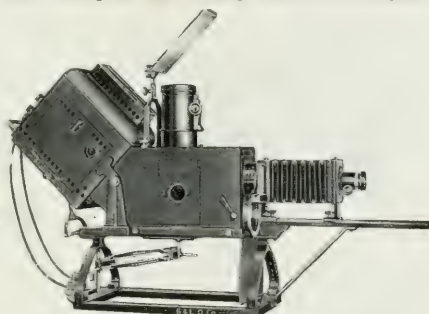
Illustrations of Convertible on following page.



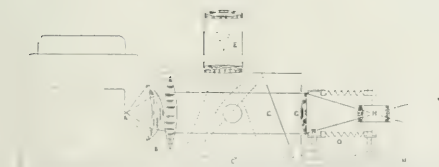
No. 44912. Convertible with Large Projection Microscope on Swinging Mount Providing Immediate Interchange with Lantern Slide Objective



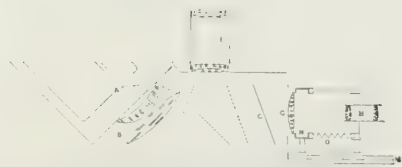
No. 44912. Convertible for Opaque and Lantern Slide Projection



No. 44912 with Lamp House Tilted for Opaque Projection by Direct Illumination

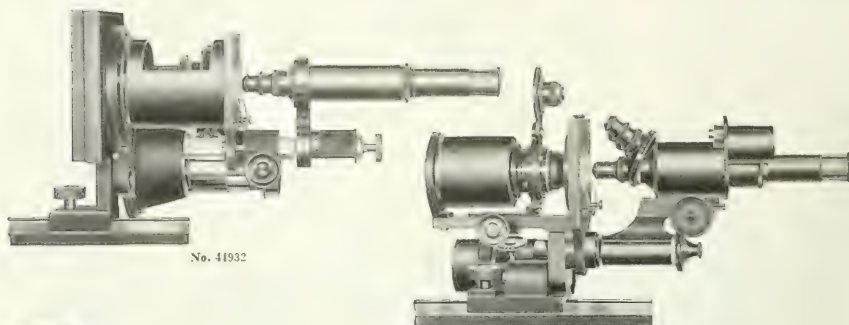


No. 44912. Optical Scheme, showing Path of Light in both Lantern Slide Projection and Opaque Projection with Direct Reading Text



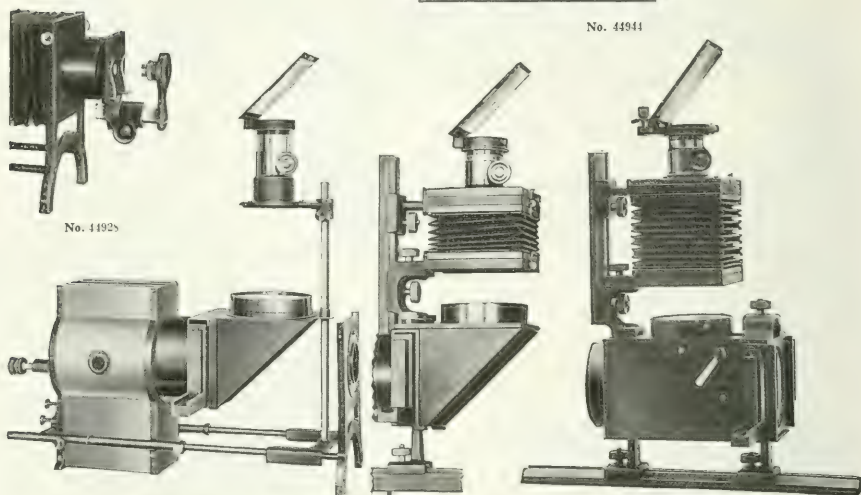
No. 44912. Optical Scheme, showing Path of Light in Opaque Projection by Direct Illumination, i.e., with Reversed Text





No. 44932

No. 44944



No. 44928

No. 44952

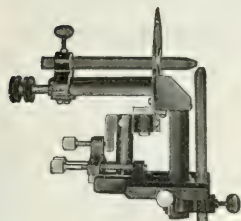
No. 44956

No. 44964

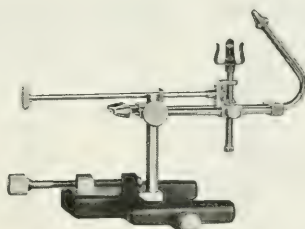
Bausch & Lomb manufacture three different models of Projection Microscopes—the Simple, Medium and Large—designed for use with their different Balopticons. The Simple Microscope has no eyepiece and is designed for work with low power objectives, particularly with their Model C Balopticon. The other two models are compound microscopes with both coarse and fine adjustments and high grade equipments. The Medium is illustrated with Universal Balopticon on page 442, and the Large with the Convertible Balopticon on page 444.

44928.	Simple Microscope, including substage condenser and three diaphragms for use in slide carrier.	15.00
44932.	Medium Microscope, including projection eyepiece, substage condenser and three diaphragms for use in slide carrier; without objectives	37.50
44936.	Medium Microscope, mounted on swinging arm for Model D or Convertible Balopticons.	45.00
44940.	“ “ mounted on special swinging arm for Universal Balopticon.	45.00
44944.	Large Microscope, including amplifier, projection eyepiece, substage water cell, three substage condensers, triple revolving nosepiece and three diaphragms for use in slide carrier; mounted on swinging arm, without projection lens or objectives.	100.00
44948.	Large Microscope, as above, but with 32, 16 and 8 mm objectives added.	117.00
44952.	Vertical Attachment for Model C Balopticon.	10.00
44956.	Vertical Attachment for Model D or Convertible Balopticon, with prism shaped mirror box and stationary mirror.	15.00
44960.	Vertical Attachment for Convertible Balopticon or Model D, with rectangular dark chamber and movable mirror permitting interchange with other forms of projection.	30.00
44964.	Vertical Attachment as described above, but with front standard, bellows and 1½-inch diameter projection lens.	42.00
44968.	Vertical Attachment, with reversing prism for use with microscope.	37.50
44972.	Extra Front Standard for Convertible Balopticon.	3.00

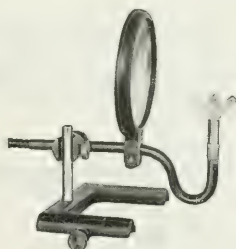
Note—When the vertical attachment remains in a permanent position on the Convertible Balopticon, it is well to have an extra front standard, so that one may be used on the horizontal and the other on the vertical bed.



No. 44976



No. 44984



No. 44988

44976. Hand-feed Arc Lamp, with centering support. 10.00  
 44980. Incandescent Electric Lamp, 250 watt nitrogen filled, with silvered globe, on support with 10-foot extension cable and Hubbell connection plug. 10.00  
 44984. Oxyhydrogen Lamp, on support. 10.00  
 44988. Acetylene Lamp with reflector and 6 feet of rubber tubing. 8.00  
 44992. Welsbach Gas Lamp with connection. 4.00  
 44996. Acetylene Gas Tank, 10 cubic ft. capacity. 10.00  
 45000. Plano-Convex Lens, 4-inch diameter, 6 $\frac{1}{2}$ -inch focus; rear lens of the regular Model C system, unmounted. 1.25  
 45004. Plano-Convex Lens, 4 $\frac{1}{2}$ -inch diameter; front lens of the regular Model C system, unmounted. Please state focus of projection lens when ordering. 1.50  
 45008. Plano-Convex Lens, 4 $\frac{3}{4}$ -inch diameter, 10-inch focus; middle lens of regular Model D system, or for special condensing system. 1.50  
 45012. Meniscus Convex Lens, 4-inch diameter, 11 $\frac{1}{2}$ -inch focus; for Model D system, or for special system. 2.50  
 45016. Plano-Convex Lens, 4 $\frac{1}{2}$ -inch diameter; front lens of the regular Model D, Universal or Convertible systems, unmounted. Please state focus of projection lens when ordering. 1.50  
 45020. Meniscus Convex Lens, 5 $\frac{1}{2}$ -inch diameter, 11 $\frac{1}{2}$ -inch focus; for Universal Balopticon, unmounted. 6.00  
 45024. Plano-Convex Lens, 6-inch diameter, 10-inch focus; for Universal Balopticon, unmounted. 3.00  
 45028. Meniscus Convex Lens, 6-inch diameter, 11 $\frac{1}{2}$ -inch focus; for Convertible Balopticon, unmounted. 7.00  
 45032. Double Convex Lens, 7 $\frac{1}{2}$ -inch diameter, 11-inch focus; for Convertible Balopticon, unmounted. 10.00  
 45036. Special Condenser System for opaque projection, in the Bausch & Lomb patented ventilated mount: for use in place of the regular double system when using the opaque attachment. 5.00  
 45040. Projection Lenses, Bausch & Lomb Standard.

Designation.	6"	7"	8"	10"	10"	12"	15"	18"	20"	15"
Size of mounting.	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
Diameter, inches.	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	2 $\frac{1}{16}$	4
Each.	7.00	7.00	7.00	7.00	14.50	14.50	14.50	18.00	18.00	50.00

Projection Table for Lantern Slides (2 $\frac{3}{4}$  x 3 inch opening) giving size of picture with objectives of various focus at different distances from the screen.

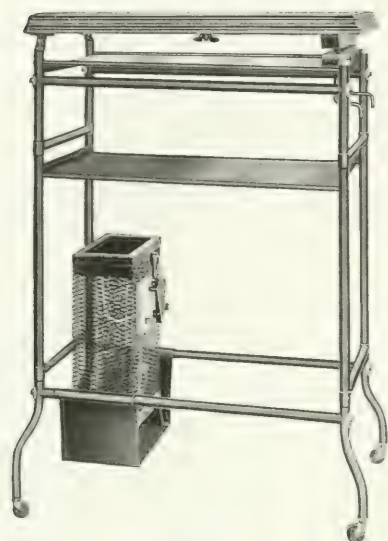
Lens Designation in Terms of Focus	Distance from lantern to screen								
	20 ft.	30 ft.	40 ft.	50 ft.	60 ft.	70 ft.	80 ft.	90 ft.	100 ft.
6-inch	10	15	20						
7-inch	8 $\frac{1}{4}$	12 $\frac{1}{2}$	17	21					
8-inch	7 $\frac{1}{4}$	11	15	18 $\frac{1}{2}$	22 $\frac{1}{2}$				
10-inch	6	9	12	15	18	21	24		
12-inch	5	7 $\frac{1}{2}$	10	12 $\frac{1}{2}$	15	17 $\frac{1}{2}$	20	22 $\frac{1}{2}$	
15-inch	4	6	8	10	12	14	16	18	20
18-inch			6 $\frac{1}{2}$	8	10	11 $\frac{1}{2}$	13	15	16 $\frac{1}{2}$
20-inch			6	7 $\frac{1}{2}$	9	10 $\frac{1}{2}$	12	13 $\frac{1}{2}$	15

Example: Using a 12-inch lens at a distance of 40 ft. from the screen, the longest side of the screen image will measure 10 ft.

Projection Table for Opaque Objects, giving size of picture with objectives of various focus at different distances from the screen.

Distance from Lens to screen	4 $\frac{1}{2}$ x 5 inch Opening			6 x 6 inch Opening		8 x 8 inch Opening	
	12" lens	15" lens	25" lens	15" lens	18" lens	15" lens	18" lens
15 ft.	6	4 $\frac{1}{2}$		5 $\frac{1}{2}$	4 $\frac{1}{2}$	7 $\frac{1}{2}$	6
20 ft.	8	6		7 $\frac{1}{2}$	6	10	8
25 ft.	10	8		9 $\frac{1}{2}$	8	13	10 $\frac{1}{2}$
30 ft.	12	9 $\frac{1}{2}$	5 $\frac{1}{2}$	11 $\frac{1}{2}$	9 $\frac{1}{2}$		
35 ft.		11	6 $\frac{1}{2}$		11		
40 ft.		13	7 $\frac{1}{2}$				
50 ft.			9 $\frac{1}{2}$				
60 ft.			11				

Example: An 18-inch lens used at a distance of 20 ft. from the screen will project an image 8 ft. square.



No. 45056



No. 45060

45044.	Projection Stand, of metal, top 30 x 14 inches.....	10.00
45048.	“ “ as above, with shelf for accessories.....	12.00
45052.	“ “ with wooden top, 32 x 16½ inches.....	16.00
45056.	“ “ as above, with revolving wooden top.....	20.00
45060.	“ “ with strong cast iron base and frame and heavy 40 x 17 inch revolving wooden top, with space beneath for adding cabinet, if desired, provided with castors and leveling screws.....	25.00
45064.	Projection Stand, as above, without revolving top.....	25.00
45068.	Screens, of heavy material with special white coating, mounted on spring roller.	
	Size, feet.....	6 x 6 7 x 7 8 x 8 9 x 9 10 x 10 12 x 12
	Each.....	4.00 6.00 7.20 12.00 13.50 15.00 20.00
45072.	Screens, Aluminum, of heavy material with metallic surface. These screens give much more brilliant images when angle including observers is not over 60°.	
	Size, feet.....	6 x 6 7 x 7 8 x 8 9 x 9 10 x 10 12 x 12
	Each.....	10.00 14.00 18.00 22.00 28.00 40.00
45076.	Screen, Aluminum, Zeiss. This screen is stretched taut on rigid metallic frame and results obtained in both micro and opaque projection are very superior to those with any other form of aluminum coated screen. Size 1.5 meter square.	
	Duty Free.....	30.00
	Duty Paid.....	39.50
45080.	Rheostat, Fixed Form, 15 amperes, 110 volts.....	7.00
45084.	“ “ “ 15 amperes, 220 volts.....	18.00
45088.	“ “ “ 5 amperes, 110 volts.....	5.00
45092.	“ “ “ 5 amperes, 220 volts.....	7.00
45096.	“ “ “ 5 amperes, 110 and 220 volts.....	8.00
45100.	Rheostat, Adjustable Form, 15 to 25 amperes, 110 volts.....	18.00
45104.	“ “ “ 15 to 25 amperes, 220 volts.....	25.00
45108.	“ “ “ 15 to 35 amperes, 110 volts.....	27.00
45112.	Hart Standard Double Pole Snap Switch, for 35 amperes on circuits up to 250 volts.....	1.50
45116.	Air Brake Lever Knife Switch, front connected; single throw, double pole.....	2.00
45120.	Switch as above, but double throw, double pole.....	2.75
45124.	Approved Cartridge Fuses for 30 amperes. Each.....	.25
45128.	Approved Cartridge Fuses for 40 amperes. Each.....	.45
45132.	Rubber Covered Twin Cable with No. 12 copper wire for 15 amperes, per foot.....	.10
45136.	Rubber Covered Twin Cable with No. 10 copper wire for 25 amperes, per foot.....	.10
45140.	Rubber Covered Twin Cable with No. 8 copper wire for 35 amperes, per foot.....	.12½
45144.	Cored Carbons, 18 mm diameter, 6 inches long, per 100.....	4.50
45148.	“ “ “ 14 “ “ “ 6 “ “ “ “.....	3.00
45152.	“ “ “ 11 “ “ “ 6 “ “ “ “.....	2.50
45156.	“ “ “ 8 “ “ “ 6 “ “ “ “.....	2.00
45160.	“ “ “ 6 “ “ “ 6 “ “ “ “.....	2.00

## PYROMETERS

We are not manufacturers of Pyrometers and are not equipped to design or make installations of Pyrometers for special purposes, as such service in every instance is better performed by the original manufacturers. It is our custom to refer inquiries involving special designs to the maker who, in our opinion, is best qualified to meet the requirements of the case. We are prepared, however, to furnish standard equipments, for both laboratory and works practice, from reliable makers of each type of Pyrometer and always at original factory prices. As a convenience to users of this catalogue we print the following fixed points of the provisional temperature scale now in use at the Bureau of Standards, Washington, D. C. (Circular No. 7, "Pyrometer Testing and Heat Measurements").

Freezing or Melting Points			
Tin.....	232° C.	450° F.	Gold..... 1063° C. 1945° F.
Cadmium.....	321° C.	610° F.	Copper..... 1083° C. 1981° F.
Lead.....	327° C.	621° F.	Nickel..... 1450° C. 2642° F.
Zinc.....	419° C.	786° F.	Palladium..... 1550° C. 2822° F.
Antimony.....	630° C.	1166° F.	Platinum..... 1755° C. 3190° F.
Aluminum.....	658° C.	1216° F.	Alumina..... 2050° C. 3720° F.
Ag-Cu.....	779° C.	1434° F.	Tungsten..... 3000° C. 5430° F.
Silver.....	961° C.	1762° F.	
Boiling Points (Centigrade)			
Naphthaline.....			217°, 9 + 0.058 (H - 760)
Benzophenone.....			305°, 9 + 0.063 (H - 760)
Sulphur.....			444°, 6 + 0.090 (H - 760)

## TYPES OF PYROMETERS

**EXPANSION PYROMETERS.** suitable for measurements up to about 1400° F. These are based on the relative expansion of metals or of a metal and graphite, and are widely used in industrial establishments. Such instruments should be tested from time to time to correct for changes in zero.

**THERMO-ELECTRIC PYROMETERS.** In pyrometers of this type temperatures are measured by the magnitude of the electromotive forces set up between wires of different materials when one junction is exposed to the temperature to be measured and the other junction (or junctions) is kept at some known temperature. For the measurement of temperatures in the interval 300° to 1600° C. thermocouples consisting of a wire of an iridium or rhodium alloy of platinum joined to a wire of pure platinum (usually designated as rare metal couples) are generally used. The most commonly used type, known as the Le Chatelier pyrometer, consists of a wire of 10% rhodium alloy with platinum joined to one of pure platinum. For the measurement of temperatures below 600° C. to that of liquid air (-200° C.) couples, known as the base metal couples, of iron-constantan, copper-constantan, etc., are used, as are also couples of iron, chromium, nickel, etc., and their alloys. These couples are more subject to oxidation than the platinum alloys and must be renewed more frequently.

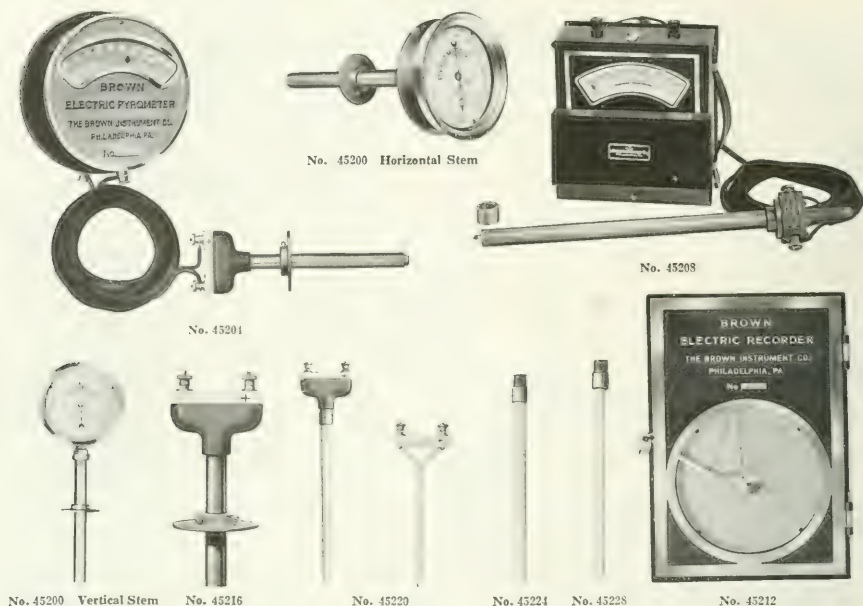
**ELECTRICAL RESISTANCE THERMOMETERS.** The fundamental principle of the Resistance Thermometer is the fact that a change in the temperature of a pure metal causes a definite change in its resistance to an electrical current. The percentage change in resistance per degree change in temperature is more than twenty as great as the percentage change in the volume of mercury with temperature. The method of measurement employed is the Wheatstone Bridge in one or other of its forms. The bridge, instead of being calibrated in ohms, is calibrated in terms of temperature and is, therefore, direct reading in temperature units. This direct reading feature is made possible in the Leeds & Northrup product by a special method of adjustment which assures that, no matter how the purity of the metal may vary, all bulbs of a given class have not only the same resistance at a given temperature but also have the same rate of change of resistance with temperature. The merits of Resistance Thermometers and Pyrometers group themselves under the two headings of reliability and flexibility. There is no method of temperature measurements as flexible as the resistance thermometer. Not only may the bulb be made so small that its total volume need not exceed a cubic quarter inch, but this requisite volume may be of any desired form, flat or round, stiff or flexible. On the other hand, the bulb may integrate the temperature over as great an area as desired either as a large single unit or as a subdivided unit. Further, considering the equipment as a whole, the system is most flexible; any number of the various bulbs of a given class may be read on one indicator with any length or size of leads, and a system already installed may be increased at will by additional bulbs and additional switching facilities. In other words, all parts are electrically interchangeable. Further than this, the thermometer may be made, if so desired, in such form as to be practically free from thermometric lag; it may have a wide range at all points of which it is equally accurate, or it may have a short range selected for special work, giving an open scale of high accuracy. In short, throughout the range of temperature extending from the lowest known up to 1800° F., a resistance thermometer system may be laid out to have almost any desired characteristics.

**OPTICAL PYROMETERS.** In optical pyrometers the intensity of the light emitted by an incandescent body whose temperature is sought is measured by comparing the intensity of the light which the body emits with that emitted by some standard source, such as a gas-lamp or an incandescent lamp under specified conditions. Optical pyrometers are, therefore, essentially in principle photometers adapted to meet the varying requirements of shop and laboratory use. In these pyrometers light of a single color is generally used to get rid of the difficulties in photometry incident to color differences and also for the reason that the laws connecting the temperature of a body and the intensity of the light emitted are simpler if we deal with a single wave length (color) only.

**RADIATION PYROMETERS.** In radiation pyrometers the energy of total radiation (i.e. that associated with the long waves which do not affect the eyes, as well as the energy of the short light waves) is measured in various ways by the heat effect which it produces, such as by the electric current set up when the radiation heats one or more junctions of two dissimilar metals, the expansion produced by the heating of a compound metal strip, and the change in resistance of a very fine metal ribbon.

All of the above types of Pyrometers are furnished with recording as well as indicating instruments, with the exception of the Optical and Expansion Pyrometers. The descriptions given in the preceding paragraphs are mostly taken from the Bureau of Standards Circular No. 7, "Pyrometer Testing and Heat Measurements." We offer reliable instruments of the types mentioned on the following pages.





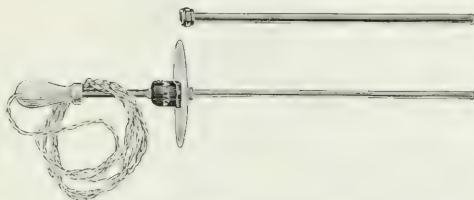
45200. Pyrometer, Expansion, Brown, with new patent improvement by which the pyrometer shows exactly the same temperature no matter how much of the stem or tube above 12 inches is inserted in the heat. With new non-tarnishing porcelain dial  $6\frac{1}{2}$  inches in diameter and with standard length of stem of 36 inches intended for 12 inches insertion in the heat. These instruments are furnished with either vertical or horizontal stem and with Centigrade or Fahrenheit dial as specified, without additional charge. With dial graduated to..... 800° F. 1200° F. 1500° F.
- Each..... 12.00 15.00 20.00
45201. Pyrometer, Thermo-electric, Brown Stationary Type, with round pattern, large size millivoltmeter, graduated in Fahrenheit or Centigrade degrees, with base metal thermo-couple, for occasional use up to 2400° F. but for constant use at not over 1800° F. Complete with 36 inch thermo-couple in protecting case, as shown in illustration, and 50 ft. of double conducting wire.... 50.00
45208. Pyrometer, Thermo-electric, Brown Portable Type, similar to above but with galvanometer in portable case. The thermo-couple is usually supplied, as in illustration, with a protecting cap which is removed for instantly measuring temperatures up to 2400° F., or which can be left in position for permanent installation at temperatures up to 1800° F. For molten metals a special form of thermo-couple is furnished. Complete with scale graduated from 0-2400° F., with base metal thermo-couple and 15 ft. of flexible wire..... 50.00
45212. Pyrometer, Thermo-electric, Brown Recording Type, wall form for permanent installation, making a perfect ink record on a daily chart with eight day clock mechanism. The instrument is furnished at the same price in portable type for horizontal use on the laboratory table. Range of temperature the same as in preceding instruments. Complete with base metal thermo-couple and 100 ft. of leads..... 100.00
- Note—Galvanometers are furnished with temperature scale in Fahrenheit or Centigrade degrees at the same price; with both Fahrenheit and Centigrade scales or with temperature and millivolt scales at \$5.00 additional.

#### Accessories for Brown Thermo-electric Pyrometers.

45216. Thermocouples, Base Metal, in standard lengths of 36 inches, complete with mount. Each..... 7.50
45220. " Platinum Rhodium, in Marquardt porcelain or quartz protecting tubes as shown in illustration. For reading temperatures up to 3000° F. With iron head, porcelain block and binding posts, complete. Length, inches 12 18 24 27 33 36 39 50 60
- Each..... 22.00 30.00 35.00 38.00 42.00 45.00 47.00 55.00 65.00
45224. Marquardt Porcelain Tubes, with metal caps, for thermocouples; to withstand a temperature of 3600° F. and with a glaze impervious to gases, but which must always be heated up slowly in order to avoid breakage. Length, inches..... 12 18 27 39
- Each..... 3.00 4.00 6.00 8.00
45228. Quartz Pyrometer Tubes, with metal caps, for thermocouples, which may be inserted while cold into a high temperature without cracking and they have a wide application because of this feature. However, they are not suitable for temperatures above 2500° F. and are not as durable as Marquardt tubes for permanent installations. Length, inches. 12 18 27 39
- Each..... 3.00 3.50 4.50 6.00



No. 45232—Galvanometer



No. 45232—Heraeus Element with Tubes, etc.

45232.	Pyrometer, Thermo-electric, Le Chatelier, with Heraeus Element for temperatures up to 1600° C. with Heraeus platinum rhodium element 60 inches long mounted in double 50 inch porcelain tubes, and with latest type Siemens & Halske pivot type galvanometer, in carrying case...	163.05
45233.	Galvanometer, Siemens and Halske pivot or suspension type, without case	75.00
45234.	Carrying case for above	7.50
45235.	Heraeus Element, 60 inches long, bare	66.00
45236.	Porcelain Tubes, 50 inches long, for Heraeus Element, per pair	15.00
45237.	Heraeus Element, 30 inches long, bare	36.50
45238.	Porcelain Tubes, 22 inches long, for above Heraeus Element, per pair	10.00
45239.	Heraeus Element, 18 inches long, bare	23.00
45240.	Porcelain Tubes, 12 inches long, for above Heraeus Element, per pair	5.00
45241.	Recording Galvanometer, Siemens & Halske Pivot type, for use with any of the above Heraeus Elements as a Recording Pyrometer	180.00



No. 45242

**POTENTIOMETER INDICATOR (THERMOCOUPLE POTENTIOMETER)** Leeds & Northrup, a new Precision Instrument for use with Thermocouples and which greatly increases the range of their usefulness in both laboratory and shop practice. The instrument is based upon the potentiometer principle, so simplified in design as to be used by an ordinary workman. Some of the essential facts and advantages of this Indicator are as follows:—

The potentiometer indicator when calibrated in terms of millivolts may be used accurately with any thermocouple, regardless of its length, cross-section, or materials, or the length of its leads.

Many kinds of base metal thermocouples retain their calibration four or five times as long with this indicator as with a millivoltmeter.

It is completely portable and requires no levelling.

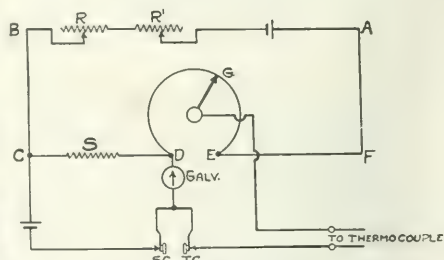
It has a scale 16 inches long—at least twice as long as the usual millivoltmeter; this means at least twice the accuracy in reading.

The thermocouples may, if desired, be long enough to have their cold ends located at the switch-board, thus having an equipment with one cold end.

The cold end temperature may be compensated for in the instrument.



No. 45250—Potentiometer Indicator



No. 45250—Electrical Scheme

The illustration of No. 45250 gives a view of the Indicator looking down on the face of the instrument. The regular routine reading is taken by depressing the key marked TC and by turning the handle which projects from the rubber plate, bringing the galvanometer to a balance. The reading is given by the scale under the index.

At intervals of say six hours, the keyed handle shown in the top of the box in the illustration should be inserted in the key ways at the side of the box, as shown in the illustration of No. 45250. The button SC should be depressed and the galvanometer brought to a balance by turning the keyed handle. This handle is keyed so that it may be removed to prevent tampering with the setting.

In course of time the dry cell of the equipment will become exhausted. At this time it will be impossible to secure a balance when the key SC is depressed. The dry cell used in the indicator is a No. 4 Columbia. To replace the dry cell turn the indicator upside down and remove the panel in the bottom of the case. The dry cell may now be changed, taking care to connect the new cell with its polarity the same as the old. For instruments which are to be permanently located at one point, we would recommend the use of an external battery consisting of two large dry cells (as Columbia No. 6) in parallel.

No. 45250 Indicator is provided with an auxiliary cold end adjustment, which, in effect, makes the instrument direct reading. This appears in the illustration as the small index and short scale lying just below the main scale. The small scale is set on its index at a point corresponding to the cold end temperature, and the readings of the instrument are then right without cold end correction.

The Potentiometer Indicator measures by balancing against the electromotive force to be measured a continuously variable known electromotive force. When the two are equal, the measurement is complete. The operation of reading, as described above, consists of balancing the electromotive force of the thermocouple against the fall in potential caused by the current flowing from the dry cell through any portion DG of the slide wire DE (see diagram). Since the dry cell is not constant, the adjusting rheostats  $RR'$ , are provided to maintain the current constant. By varying  $RR'$  the current flowing is adjusted until the drop between C and D is just equal to the standard cell voltage. It is this operation which is performed when adjustment is made with removable handle. Particular attention is drawn to the fact that the Indicator may be used with any thermocouple if the scale is in millivolts as it is regularly furnished. If scale is to be graduated in degrees of temperature the couple with which it is to be used must be sent to the factory for calibration with the Indicator. Indicator with range in millivolts from 0 to 16 is intended for use with rare metal couples and from 0-40 or 0-70 with base metal couples. Prices do not include thermocouples.

45242.	Potentiometer Indicator, as above, without cold end compensation range, 0-10, 0-16, 0-40 or 0 to 70 millivolts	125.00
45244.	Extra for other ranges whether calibrated in millivolts or in temperature units	5.00
45248.	Extra for double range	20.00
45250.	Potentiometer Indicator, as above, with cold end compensator ranges, 0-10, 0-16, 0-40 or 0-70 millivolts	140.00
45252.	Extra for other ranges whether calibrated in millivolts or in temperature units	5.00

**TEMPERATURE INDICATOR, Leeds & Northrup Balance Type, for use with all Resistance Thermometers of class A, 40 260° F., Class B, up to 1000° F., and Class C, to 1800° F., as listed below.** The Indicator consists of a direct reading Wheatstone Bridge with a self-contained Galvanometer of new design and great sensitivity. The Indicator is calibrated to read directly in degrees of temperature when connected to any bulb of a given class. The total length of the scale is 16 inches and, as a balance may be readily obtained to  $\frac{1}{16}$  of an inch, the Indicator is easily read to  $\frac{1}{16}$ ths of 1%. To make a reading with this





No. 45254—Temperature Indicator



No. 45260

Indicator, depress key to connect in battery and turn the scale until the galvanometer is at its balance position, at which time the position of the scale on the index gives directly the temperature. The operator in thus reading balances the bridge; in such a reading all questions of galvanometer calibration are eliminated. On this account a balance method is always more accurate than a deflection method.

45254. **Temperature Indicator**, as above, complete in carrying case, with galvanometer and battery; but without resistance bulb; length of scale 16 inches; case  $9\frac{1}{2} \times 5\frac{1}{2}$  inches; weight 5 lbs. .... **70.00**

**RESISTANCE BULBS, CLASS A**, for use with the above Indicator. These are electrically interchangeable and differ only in the style of mounting used. They are regularly furnished in the following ranges:— $-40^{\circ}$  to  $120^{\circ}$  F.,  $+10^{\circ}$  to  $110^{\circ}$  F.,  $30^{\circ}$  to  $250^{\circ}$  F.,  $-20^{\circ}$  to  $120^{\circ}$  C. and  $-30^{\circ}$  to  $50^{\circ}$  C. Ranges other than those listed cost \$5.00 additional.

45256. **Resistance Bulb, for General Service**. This bulb is about as quick acting as the ordinary commercial mercury bulb. It has been designed to secure a maximum of strength and is practically indestructible. The leads are firmly anchored to the bulb. Tube is of brass with dull black lacquer; diameter of tube  $\frac{3}{8}$  inch; length of winding 2 inches with length over all 5 inches. .... **10.00**

45260. **Resistance Bulb, Quick Acting**. This bulb will follow temperature changes about as rapidly as will a long bulb mercury thermometer and may be inserted into mercury without injury. Tube is of steel with ebonite head; diameter of tube  $\frac{1}{4}$  inch; diameter of head  $\frac{3}{8}$  inch; length of winding  $1\frac{1}{2}$  inches and  $4\frac{1}{2}$  inches length over all. .... **14.50**

45264. **Resistance Bulb, with Non-conducting Case**. This is exactly the same as No. 45256 except that the stem is encased in ebonite. This construction is especially desirable when the bulb is to be used when considerable temperature difference will exist between the stem and the sensitive end of the bulb. The non-conducting stem prevents conduction of heat along its length. This bulb may be employed as "wet bulb" in hygrometry with success. Diameter of stem  $\frac{1}{8}$  inch; other dimensions same as No. 45256. .... **12.00**

45268. **Resistance Bulb, with Lead Covered Leads**. This bulb is the same as No. 45256 excepting that it has lead covered leads. The lead cable is soldered with waterproof joint to the stem of the thermometer and, in ordering, a sufficient length of lead covered lead should be ordered to extend beyond the moisture zone. The cable used is  $\frac{1}{2}$  inch outside diameter with  $\frac{1}{16}$  inch wall. As widely used in the U. S. Department of Agriculture for soil investigations. With one foot of leads. .... **11.00**

**Extra per foot for additional length of leads**. .... **.15**

**RESISTANCE BULBS, CLASS B**, for use with above Temperature Indicator in ranges, as follows:  $200^{\circ}$  to  $1000^{\circ}$  F.,  $50^{\circ}$  to  $550^{\circ}$  F.,  $50^{\circ}$  to  $550^{\circ}$  C. and  $0$  to  $250^{\circ}$  C. These bulbs are electrically interchangeable with each other in Class B and with those of Class C. The material is bare platinum wound on mica which is protected by a case of pure nickel without the use of porcelain.

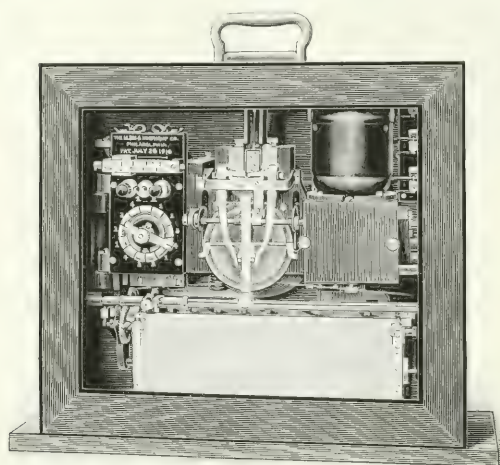
45272. **Resistance Bulb, Round**, 10 inches long; length of winding and stem 10 inches; length of winding 3 inches; diameter of bulb  $\frac{3}{8}$  inch, of head  $1\frac{1}{2}$  inch. .... **28.00**  
**Extra per inch for Bulbs longer than 10 inches**. .... **.75**

45276. **Resistance Bulb, Quick-acting Type**. In this bulb the platinum wire is wound on a thin sheet of mica and this in turn insulated by a thin sheet of mica laid on each side of the flat coil. This is inserted into a flattened metal tube. The stem is left round. The large surface of this type of bulb and its low heat capacity make it extremely quick in its action; in a liquid it is practically instantaneous in its action. Length of winding and stem, 10 inches; length of winding 4 inches; thickness at winding  $\frac{1}{2}$  inch; width at winding  $\frac{1}{2}$  inch; diameter of stem  $\frac{3}{8}$  inch. .... **32.00**  
**Extra per inch for Bulbs longer than 10 inches**. .... **.75**  
**Extra if bulbs are to be used in pressures of over 50 lbs. per square inch**. .... **2.00**



**RESISTANCE BULBS, CLASS C**, for use with the above Temperature Indicator in the following ranges; 800°-1800° F., 200°-1800° F., 500°-1000° C. and 0-1000° C. These Bulbs are electrically interchangeable with each other and with those in Class C. The resistance material used is an especially pure platinum wound on a mica cross. The mica of this cross is treated by a process which leaves it of a hard, non-transparent, rock-like structure. In the standard type of construction this platinum wound form is encased in a Royal Berlin glazed porcelain tube. A clear quartz tube is at times desirable although it is slightly more expensive.

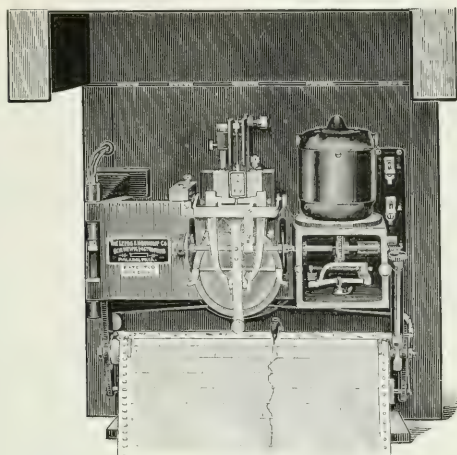
45280. **Platinum Resistance Bulb**, for measurements of the highest precision; porcelain tube with fibre head; length of bulb 3 inches; diameter of tube  $\frac{1}{4}$  inch; entire length of tube 19 inches; diameter of head  $\frac{1}{4}$  inches. These Bulbs are widely used in permanent installations for some of the largest chemical works in the U. S.. When used in connection with the above Temperature Indicator No. 45252 the accuracy of the readings without correction is 3° in 500° or 6° in 1000° of range. 60.00
45284. **Platinum Resistance Bulb**, of same construction as No. 45280. When bulbs of this type are used in connection with No. 45252 the accuracy of the readings without corrections and direct from the scale is 8° in 500° or 12° in 1000° of range. 40.00
45288. Extra per inch for Bulbs over 19 inches in length. .50



No. 45296 and No. 45304—Temperature Recorder. Curve Printing Type

**TEMPERATURE RECORDERS, Leeds & Northrup Patent**, for use with Leeds & Northrup Resistance Thermometers of class corresponding to the range required, and for use with Thermocouples. Consisting of a patented mechanism for moving with ample power a pen, print wheel, or other device, in response to the necessarily feeble deflecting forces of a sensitive galvanometer. These Recorders are furnished in the Curved Drawing Type for one temperature point, and in the Curved Printing Type for from two to sixteen temperature points. Motors will operate on 100-120 volts, a. c. or d. c., or 220-250 volts, a. c. or d. c., as specified. The paper speed is 3 inches per hour. The record in the Curve Drawing Type is made in ink by a pen, and in the Curve Printing Recorder by a print wheel drawn on a track by power supplied by the motor but controlled by the temperature. The process is entirely mechanical, only the motor and the measuring circuit involving electric current. The speed of the motor is automatically held constant even though the voltage on the line on which it is operated varies through a range of 20%.

45292. **Recorder for Resistance Thermometer, Curve Drawing Type**, for one temperature point. This instrument is a recording Wheatstone Bridge. When for use with resistance bulbs the recorder is calibrated to record directly in temperature units. The accuracy of the recorder is equal to  $\frac{1}{2}\%$  of the range of the instrument. The distance separating the recorder from the bulb whose temperature is being measured is without effect upon the record. Should it be desired to use the same recorder with different bulbs at different distances from the recorder this may be done by providing a suitable hand operated selector switch. The resistance thermometer has no feature corresponding to the "cold end" of a thermocouple. The indications of the recorder are controlled solely by the temperature of the sensitive end of the bulb. 200.00
45296. **Recorder for Resistance Thermometers, Curve Printing Type**, for temperature points as indicated.
- |                       |        |        |        |        |        |        |        |        |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| Number of points..... | 2      | 4      | 6      | 8      | 10     | 12     | 14     | 16     |
| Each.....             | 300.00 | 330.00 | 360.00 | 390.00 | 420.00 | 450.00 | 480.00 | 510.00 |



No. 45300 and No. 45292—Temperature Recorder. Curve Drawing Type



No. 45328

45300. Recorder for Thermocouples, Curve Drawing Type, for one temperature point, similar to No. 45292 except this instrument is a recording potentiometer. To record temperature it may be used with any thermocouple of any length, cross-section or material. With any thermocouple the accuracy of the record is entirely independent of the resistance of the leads and, therefore, of their length, cross-section and materials. For ranges of 15 millivolts and over, the accuracy of the record is  $\frac{1}{2}\%$  of the range; 15 millivolts are equivalent to about  $1500^{\circ}\text{C}$ . on a platinum platinum-rhodium couple and to about  $275^{\circ}\text{C}$ . on an iron constantin couple. 250.00

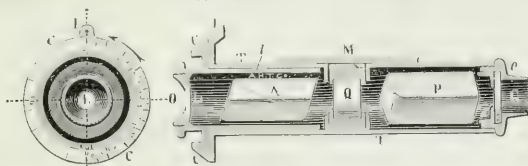
45304. Recorder for Thermocouples, Curve Printing Type, for temperature points as indicated.

No. of points.....	2	4	6	8	10	12	14	16
Each.....	400.00	430.00	460.00	490.00	520.00	550.00	580.00	610.00
Extra for special range.....								30.00
Extra for special paper speed.....								10.00
45316. Recorder Pen.....								1.50
45320. " Paper, per roll of 25 yards.....								2.50
45324. " Ink, per bottle.....								.25

45328. Pyrometer, Siemens Water, for temperatures up to  $1000^{\circ}\text{C}$ . or  $1800^{\circ}\text{F}$ . The metallic cylinders supplied with the pyrometer are exposed to the heat to be measured after which they are carefully inserted into the vessel containing exactly 1 pt. of distilled water. The rise in temperature of the water is measured by the mercurial thermometer furnished with the outfit. This reading added to the temperature of the water before the insertion of the heated cylinder will give the temperature of the flue, furnace or heated space in which the metal cylinder has been placed.

Duty Free..... 27.00

Stock..... 35.00



No. 45332

45332. Pyrometer, Optical, Mesure and Nouel, for temperatures up to  $1500^{\circ}\text{C}$ ., consisting of a quartz plate Q interposed between Analyzer A and Polarizer P. When polarized light which is not monochromatic passes through a properly prepared quartz plate, the plane of polarization is rotated through an angle the magnitude of which depends on the wave length of the light and the thickness of the quartz. The field will, therefore, appear colored according to the composition of the light which passes through the instrument. When an incandescent body is viewed through the instrument the analyzer is rotated until the sensitive tint is observed. The reading on the circle C determines the temperature to be measured with the aid of the scale furnished with the instrument. Complete in leather case.

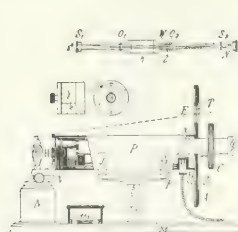
Duty Free..... 32.50

Duty Paid..... 46.80

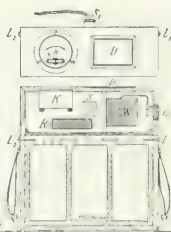
45336. Large Objective for use with above for accurate observations of temperatures below  $900^{\circ}\text{C}$ .

Duty Free..... 11.25

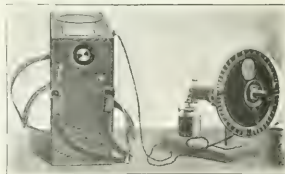
Duty Paid..... 16.20



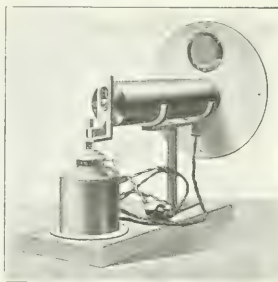
Optical Scheme



Standardization of Osram Lamp



Direct Reading Temperature Scale



Amyl-Acetate Lamp in Position



In Operation

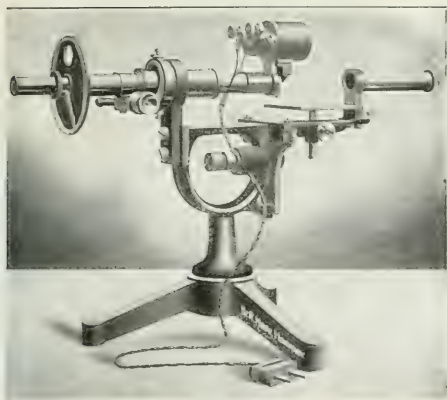
**PYROMETER, WANNER OPTICAL, 1914 Model**, consisting of a photometric telescope containing a standard Osram lamp with which the quantity of light emanating from the heated mass to be measured is compared. The Osram lamp must be standardized from time to time by adjustment with a standard Amyl Acetate lamp and current from the accumulator supplied must be controlled by means of a rheostat and ammeter. The new 1914 models listed below are distinctive from the instruments listed heretofore in that the whole range of temperature from 650° to 4000° C. can be measured on one instrument, whereas with the old outfits two instruments are necessary to cover the entire range. The prices have also been distinctly reduced on the new models. Some of the distinctive features embodied in the new 1914 model are as follows:—

Optical parts enclosed in polished metal protecting tube of uniform diameter.  
Adjusting glasses placed entirely within the tube but adjustable from outside.  
Simplified arrangement for interchange of incandescent lamp after removing outside tube.  
Direct reading temperature scales very legible because of white graduations on black ground.

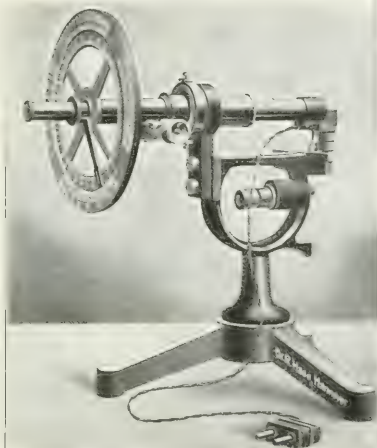
Outfits are complete for operation excepting the charging of the accumulators. Any of the Pyrometers are furnished with certificate of the Physikalisch-Technische Reichsanstalt at an extra cost of \$10.50 duty free and \$14.00 duty paid.

		Duty Free	Duty Paid
45340.	Pyrometer, Wanner Optical, for temperatures from 650° to 1200° C., as above described including amyl acetate lamp, support for standardizing, ammeter, resistance and accumulator; with graduations in degrees of arc and separate temperature scale.....	105.00	140.00
45344.	Pyrometer, as above, but with direct reading temperature scale.....	112.50	150.00
45348.	Pyrometer, Wanner Optical, for temperatures from 650° to 2000° C., complete as above, with graduations in degrees of arc and separate temperature scale.....	135.00	180.00
45352.	Pyrometer, as above, but with direct reading temperature scale.....	142.50	190.00
45356.	Pyrometer, Wanner Optical, for temperatures from 650° to 3000° C., complete, with graduations in degrees of arc and separate temperature scale.....	142.50	190.00
45360.	Pyrometer, as above, but with direct reading temperature scale.....	150.00	200.00
45364.	Pyrometer, Wanner Optical, for temperatures from 650° to 4000° C., complete, with graduations in degrees of arc and separate temperature scale.....	165.00	220.00
45368.	Pyrometer, as above, but with direct reading temperature scale.....	172.50	230.00
45372.	Pyrometer, Wanner Optical, for temperatures from 600° to 7000° C., complete, with graduations in degrees of arc and separate temperature scale.....	195.00	260.00
45376.	Pyrometer, as above, but with direct reading temperature scale.....	202.50	270.00
<b>Accessories for the Wanner Pyrometer.</b>			
45380.	Protecting Case for the Pyrometer proper and adjusting support.....	4.50	6.00
45384.	Amyl Acetate, tested, per bottle.....	1.05	1.40
Note—The above Protecting Case and a bottle of Amyl Acetate are regularly sent out with each outfit unless specifically ordered to be omitted.			
45388.	Incandescent Lamp.....	1.00	1.35
45392.	Tripod Support, adjustable in all directions and folding for convenient carrying; very convenient in factory use.....	9.00	12.00
45396.	Accumulator, in box with leather strap, but without ammeter, resistance or contact.....	16.50	22.00
45400.	Ammeter, resistance and contacts for above.....	25.50	34.00





No. 45404



No. 45412

45404. Laboratory Combination of Wanner Pyrometer and König Spectrophotometer, particularly recommended for laboratory measurements of both temperature and absorption investigations in spectrophotometry; with small scale with absorption angle only, for temperatures up to 2000° C. ....
- |   |           |           |
|---|-----------|-----------|
|   | Duty Free | Duty Paid |
|   | 195.00    | 260.00    |
| 45408. Laboratory Combination, "as above, for temperatures up to 4000° C. ....  | 225.00    | 300.00    |
| 45412. " " " " but with large scale including polarisation angle device and temperature scale, for temperatures up to 2000° C. .... | 217.50    | 290.00    |
| 45416. Laboratory Combination, same as above, but for temperatures up to 4000° C. ....  | 247.50    | 330.00    |



No. 45420



Method of Using Thwing Radiation Pyrometer



No. 45432

**PYROMETERS, THWING TOTAL RADIATION.** for the accurate measurement of high temperatures, based on Stefan-Boltzmann Radiation Law, i.e., the energy radiated by a black body is proportional to the fourth power of the absolute temperature. With no upper limit, and used commercially for temperatures as low as 500° C. Radiations of heat from a black body, or body under black body conditions as in an enclosed furnace, are concentrated by means of a receiving tube on a sensitive thermocouple and hence conveyed to the galvanometer, where temperatures are read directly in degrees. As the thermocouples have but small heat equilibrium, a reading can be obtained in five seconds. No tripod is required, the receiving tube being held in the hand and pointed at the object temperature of which is to be measured. No focussing is required as the instrument is practically independent of distance, so long as the diameter



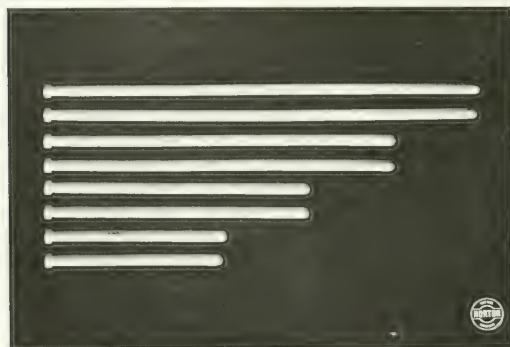
# Thwing Radiation Pyrometer (Continued)

of the surface is 1 inch for each 8 inches of distance for a low range instrument and correspondingly less for instruments of higher range. Any intelligent workman can operate the instrument as nothing is required other than to point the receiving tube at the object and read the temperature from the scale. The outfit is not dependent upon storage batteries or standard of luminosity or upon the color perception of the observer and is equally accurate in determining temperature of hot metals in the open and not affected by extraneous light falling upon the body observed. Galvanometer is dead-beat, extremely sensitive and highly accurate. Complete outfit weighs 7 lbs.

45420. Pyrometer, Thwing Portable Indicating Radiation, with any single range temperature scale, complete..... 120.00
45424. Pyrometer, Thwing Portable Indicating Radiation, with any double range temperature scale, as 2500° F. to 3600° F., 2000° C. and 1400° C. These two scales are especially suited for open-hearth furnace work, giving correct temperatures of molten steel in the furnace and while pouring. Complete..... 130.00
45428. Pyrometer, Thwing, Wall Pattern Indicating Radiation, with ventilated receiving tube for permanent installation above a furnace, or barium chloride bath..... 120.00
45432. Pyrometers, Thwing, Recording Radiation, in single and multiple record units. These Pyrometers have been found of extreme value on cement kilns, in copper smelters, incinerators, sintered ore plants, etc. With single record recorder..... 180.00
45436. Pyrometers, Thwing, Recording Radiation, as above, with two record recorder..... 245.00
- Note—Prices of Multiple Records up to 15 records on a single 10 inch chart, quoted on request.
45440. Pyrometer Cones, Seger, for temperatures from 600° C. to 2000° C.  
Per box of 100..... 1.00 Each, in quantities less than 100..... .05

The following are the official melting points:—

Cone Number	Degrees Centigrade	Cone Number	Degrees Centigrade	Cone Number	Degrees Centigrade	Cone Number	Degrees Centigrade	Cone Number	Degrees Centigrade	Cone Number	Degrees Centigrade
022	600°	012a	855°	02a	1060°	9	1280°	19	1520°	34	1750°
021	650°	011a	880°	01a	1080°	10	1300°	20	1530°	35	1770°
020	670°	011a	900°	1a	1100°	11	1320°	26	1580°	36	1790°
019	690°	09a	920°	2a	1120°	12	1350°	27	1610°	37	1825°
018	710°	08a	940°	3a	1140°	13	1380°	28	1630°	38	1850°
017	730°	07a	960°	4a	1160°	14	1410°	29	1650°	39	1880°
016	750°	06a	980°	5a	1180°	15	1435°	30	1670°	40	1920°
015a	790°	05a	1000°	6a	1200°	16	1460°	31	1690°	41	1960°
014a	815°	04a	1020°	7	1230°	17	1480°	32	1710°	42	2000°
013a	835°	03a	1040°	8	1250°	18	1500°	33	1730°		

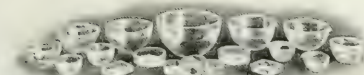


No. 4544

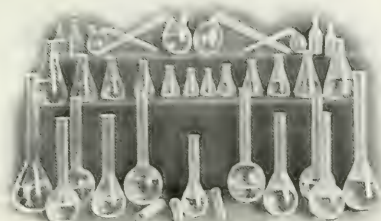
45444. Pyrometer Tubes, Alundum, impervious to gas under normal pressures through a wide range of temperature. With a high deformation point which, in connection with their imperviousness and high thermal conductivity, recommend them for this purpose. The tubes all have an internal diameter of  $\frac{1}{16}$  inch and an external diameter of  $\frac{1}{8}$  inch and are furnished with flange.
- |                     |      |      |      |      |      |      |      |
|---------------------|------|------|------|------|------|------|------|
| Length, inches..... | 12   | 18   | 24   | 27   | 30   | 36   | 42   |
| Each.....           | 2.40 | 3.60 | 4.80 | 5.40 | 6.00 | 7.20 | 8.40 |



No. 45504



No. 45512



No. 45516, etc.

**QUARTZ APPARATUS, TRANSPARENT.** Pure Fused Rock Crystal. Rock crystal has a very small coefficient of expansion, will not crack on subjection to the most violent and sudden changes of temperature and is insoluble in water and volatile acids, with the exception of hydrofluoric, and has a melting point of approximately 1600° C. The coefficient of expansion between 0° and 1000° C. is 0.0000054. The specific weight is 2.22. The coefficient of expansion for D is 1.4385 and the dispersion from C - F is 0.00676. It is transparent to ultra violet light above 185  $\mu$ . For prices on Opaque Fused Silica ware see headings of various apparatus, i.e., Beakers, Crucibles, Flasks, etc.

45500.	<b>Beakers, Transparent Quartz, conical shape, either with or without spout.</b>					
	Capacity, cc .....	30	50	100	200	
	Diameter, mm .....	35	42	53	63	
	Each .....	3.60	4.80	8.00	12.09	
45504.	<b>Crucibles, Transparent Quartz, without lids.</b>					
	Capacity, cc .....	10	20	30	50	100
	Diameter, mm .....	28	35	40	50	65
	Each .....	2.40	3.95	4.75	7.09	10.50
45508.	<b>Lids, Each.</b>		1.00	1.75	2.25	3.00
				4.25	5.00	
45512.	<b>Dishes, Transparent Quartz, round bottom, with or without spout.</b>					
	Capacity, cc .....	10	50	100	200	275
	Diameter, mm .....	34	60	75	98	196
	Each .....	2.90	4.80	7.25	12.00	16.00
45516.	<b>Flasks, Transparent Quartz, flat bottom, Erlenmeyer shape.</b>					
	Capacity, cc .....	50	100	200	300	
	Each .....	4.00	7.25	11.00	16.00	
45520.	<b>Flasks, Kjeldahl, Transparent Quartz.</b>					
	Capacity, cc .....	100	200	300	700	
	Each .....	7.25	11.00	15.00	20.00	
45524.	<b>Retorts, Transparent Quartz, plain.</b>					
	Capacity, cc .....	50	100	200	500	
	Each .....	7.50	10.00	15.00	27.50	
45528.	<b>Retorts, Transparent Quartz, with tubulature.</b>					
	Capacity, cc .....	50	100	200	500	
	Each .....	8.50	11.25	16.50	29.59	
45532.	<b>Test Tubes, Transparent Quartz.</b>					
	Length, mm .....	100	100	150	150	200
	Diameter, mm .....	15	20	15	20	20
	Each .....	2.50	3.25	3.75	4.75	6.00
45536.	<b>Tubing, Transparent Quartz, with walls .5 to .75 mm. In lengths up to two feet.</b>					
	Bore, mm .....	1-2	3	4-5	6-7	8
	Per foot .....	.95	2.00	2.65	3.10	3.65
	Bore, mm .....	12-13	14	15-16	17-18	19
	Per foot .....	5.25	5.75	6.25	7.75	8.60
						10.00
						11.00

## RADIO-CHEMISTRY APPARATUS

45540. **Radio-Active Minerals**, consisting of the strongest minerals from which radium is being extracted. Radiographs may be taken with any of these specimens by placing the mineral or ore on the sensitive side of a plate in a black and orange cover and allowing same to remain in a dark place for two or three days, after which development is carried on in the usual way. The specimens in this collection and their localities are as follows: -

Pitchblende.....	Joachimsthal	Autunite.....	Portugal
Carnotite.....	Colorado	Aeschynite.....	Ural
Fergusonite.....	Ceylon	Tantalite.....	Sweden
Monazite.....	Brazil	Pitchblende.....	Conn. Mass.
Samarskite.....	Norway	Cleveite.....	Sweden
Thorite.....	Ceylon	Orangite.....	Norway

Collection, as above, of twelve specimens..... 7.50

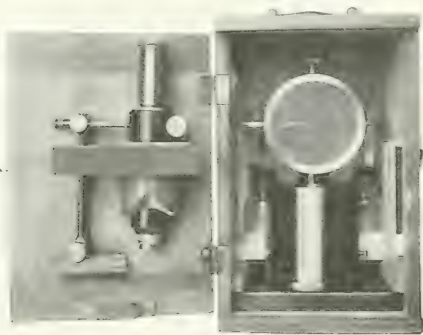


No. 45542



No. 45546

45542. **Spinthariscopes**, a fluorescent screen over which is mounted a small particle of radio-active substance. When viewed through the magnifying lens brilliant scintillations are observed. When observations are made in daylight it is necessary to remain in a dark room for about five minutes before scintillations are plainly visible. Small radium photographs may be made with the instrument and exposures made on photographic negatives by removing the magnifying lens.... 2.50
45546. **Standard Battery, Krueger**, for electrostatic measurements, consisting of 100 Weston Normal Elements of small size with a total electromotive force of about 100 volts and with 105 ohms internal resistance. With six terminals. As used in charging electrometers, standardizing electroscopes, etc.
- Duty Free..... 18.00      Duty Paid..... 24.00

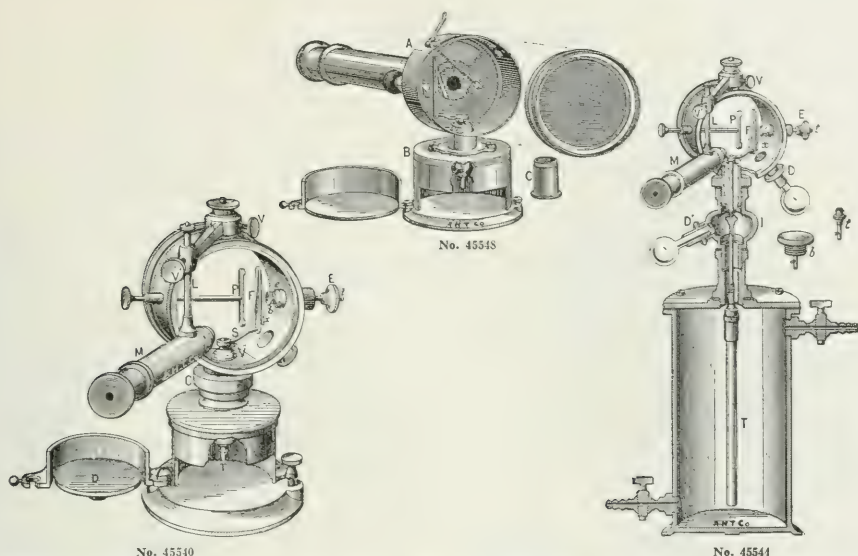


No. 45548—in portable carrying case



No. 45548—ready for use

45548. **Electroscope, Curie Type**, portable model of American make for field use in the determination of the radio-activity of American ores, such as the Colorado Carnotite, and as used in the U. S. Bureau of Mines laboratories for this work. The illustration shows the door of the ionizing chamber closed so that the circular plate, on which the powdered ore for testing is placed, is not shown. The instrument is furnished with a reading microscope with millimeter scale in the ocular and with portable carrying case as shown. In the case are provided receptacles for two standardized samples of powdered Carnotite as listed below. In the field the testing is made by measuring the rate of fall of the leaf with the ore to be tested as compared with a standardized ore of known Uranium content. With vulcanite charging rod and descriptive circular as to operation..... 50.00
45550. **Carnotite**, powdered to 60 mesh, with percentage of Uranium Oxide ( $U_3O_8$ ) determined by Ledoux & Co., for use as a reference standard with above Electroscopes. Per 50 gram vial..... 1.50



No. 45540

No. 45544

**ELECTROSCOPE, CURIE, original French make.** This instrument is furnished with equipment for measuring the radio-activity of solids, liquids and gases and also in a small portable form for field work. The laboratory form for solids is conveniently arranged so that measurements of a great range of radio-activity as compared with that of Oxide of Uranium are possible. These adjustments are accomplished either by varying the area exposed on the plate "D" of the material to be measured or by changing the form of the discharging rod "A". Illustration No. 45540 shows the Electroscope as arranged for solids, No. 45544 for liquids and gases and No. 45548, the portable form for field work. Each instrument is furnished with reading microscope "M", with micrometer scale on the ocular, with which the fall of the leaf during discharge is very accurately measured. The principal constants of this apparatus as furnished by the French makers are as follows:—

The potential required to deviate the leaf through the entire field of the microscope is about 300 volts and the value of each division in the eyepiece micrometer is 0.4 volt but readings may be estimated to 0.1 volt. The capacity of the Electroscope when mounted on a cylinder of 3 liters is 14 to 15 cm, this capacity being independent of the angle of deviation. The speed of the spontaneous fall of the leaf under the best conditions, for instance 0.0033 div/sec, is 0.0013 volt/sec. The minimum speed of the fall measurable (ten times as great as the natural leak) is 0.01 volt sec. The minimum current measurable in the cylinder is  $2 \times 10^{-18}$  amperes. The minimum quantity of radium emanation measurable in the cylinders of 3 liters is 0.0019 mmg. min. The minimum amount of Radium Bromide which can be estimated by the emanation method (this quantity corresponds to that contained in 10 liters of sea water or in 50 grams of deep sea sand) is  $2, 3 \cdot 10^{-7}$  mmgr. See *M. Joly, Phil. Mag., mars et juillet 1903*. The minimum radio-activity measurable in solids, taking Oxide of Uranium as unity, is 1/200. See *P. Curie, Œuvres, p. 375, p. 591 et 593; Mme. P. Curie, Ann. Ch. Phys., Septembre, Oct. Nov., 1903; Mme. P. Curie, "Traité de Radioactivité" (Gauthier-Villars); Mme. P. Curie, "Le Radium," 7, 1910, p. 65 à 70; and A. Laborde, "Méthodes de mesure employées en Radioactivité" (Encyclopédie Léauté, Gauthier-Villars, editl).*

45552.	Electroscope, Curie, complete for mineralogists, with reading microscope and discharging apparatus with plate and accessories.	Duty Free.....	56.25	Duty Paid.....	67.50
45554.	Electroscope, Curie, as above but without the lower cylinder, base and plate D, for mounting specially to suit the work intended.	Duty Free.....	33.00	Duty Paid.....	39.60
45556.	Electroscope, Curie, complete portable outfit in case.	Duty Free.....	50.00	Duty Paid.....	60.00
45558.	Discharging Cylinder of 3 liters capacity, with metallic stopper and support for the Electroscope.	Duty Free.....	16.25	Duty Paid.....	19.50
45560.	Discharging Cylinder, as above, with removable cover.	Duty Free.....	17.50	Duty Paid.....	21.00
45562.	Discharging Cylinder, 450 cc capacity, with metal stopper and support for the Electroscope.	Duty Free.....	12.50	Duty Paid.....	15.00
45564.	Black Oxide of Uranium ( $U_3O_8$ ) for use as a relative standard. In 10 gram vials.	Duty Free.....	0.40	Duty Paid.....	0.50
45566.	Accessory for automatically stoppering above cylinders.	Duty Free.....	3.75	Duty Paid.....	4.50

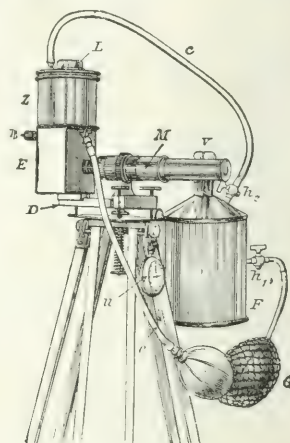


## ELECTROSCOPE, CURIE (cont.)

45568.	Connecting Support for cylinders. Duty Free.....	3.00	Duty Paid.....	3.60
45570.	Connecting Support for cylinders, with automatic stopper. Duty Free.....	6.25	Duty Paid.....	7.50
45572.	Dessicating Chamber. Duty Free.....	6.25	Duty Paid.....	7.50
45574.	Extension Rod, with bayonet catch for removing the electrodes from cylinder. Duty Free.....	.50	Duty Paid.....	.60
45576.	Connecting Tube for the two cylinders. Duty Free.....	3.00	Duty Paid.....	3.60
45578.	Metallic tubular cooling device and boiler. Duty Free.....	18.75	Duty Paid.....	22.50



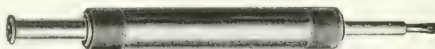
No. 45580



No. 45582

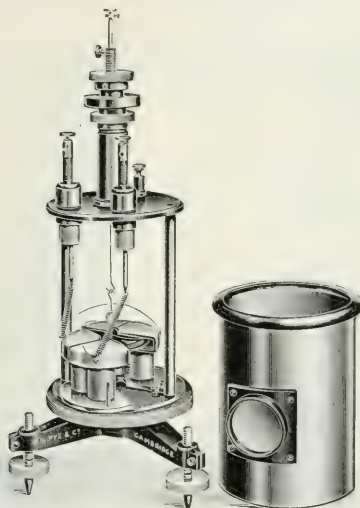
**ELECTROMETER, SCHMIDT**, for both solid and liquid substances, designed especially for the determination of very small Radium quantities by the emanation method, the emanation of spring and other natural waters by the so-called "shaking" method, for the plotting of decay curves and for the comparison of the radio-activity of minerals and other solids. See *Physik. Zeitschrift*, Nr. 18, 1905, *Physik. Zeitschrift* Nr. 7, 1906, and *Fortschritte der Medizin* Nr. 27, 1909.

45580.	Electrometer, Laboratory Form, as above with shaking flask, blower, thermometer, connecting tubing, stopwatch, rubber rod; frame for winding up wires and dish. Duty Free.....	67.50	Duty Paid.....	90.00
45582.	Electrometer, as above, portable form, with tripod shaking flask, blower, thermometer, connecting tubing, stopwatch, rubber rod, frame for winding up wires, and dish. Duty Free.....	82.50	Duty Paid.....	110.00
45584.	Radium Standard Solution, as made in Prof. Schmidt's laboratory, in Curie flask. Duty Free.....	7.50	Duty Paid.....	10.00

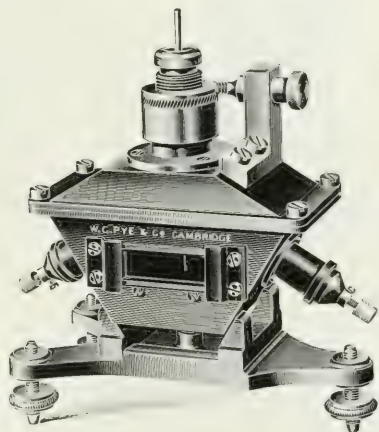


No. 45586

45586.	Charging Rod, for Electroscopes. The friction is produced between flannel and celluloid. Very convenient to use and produces both positive and negative charges. Duty Free.....	4.50	Stock.....	6.00
--------	--	------	------------	------

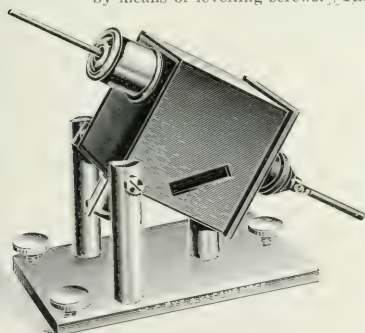


No. 45588



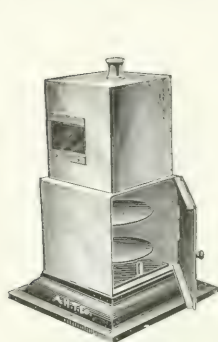
No. 45598

45588. **Electrometer, Dolezalek Pattern**, with long ambroid insulation to quadrants and terminals, the latter being placed in a very convenient position on top of the instrument and readily removable for cleaning. The suspension is strong phosphor-bronze with high sensitivity. Ample adjustment in height and rotation of the vane relative to quadrants is provided with zero adjustment without altering relative position of vane and quadrants. The scale readings are proportionate over a wide range. The use of phosphor-bronze suspension renders this instrument suitable for students' work, the sensitivity being approximately 300 millimeters at one meter radius for a difference of potential of one volt between the quadrants with the vane charged at 100 volts.
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 43.50 | Duty Paid | 63.80 |
|-----------|-------|-----------|-------|
45590. **Extra Phosphor-Bronze Suspension**, with hooks.
- |           |     |           |      |
|-----------|-----|-----------|------|
| Duty Free | .75 | Duty Paid | 1.10 |
|-----------|-----|-----------|------|
45592. **Extra Vane**, for above, with either plane or concave mirror, complete with suspension.
- |           |      |           |      |
|-----------|------|-----------|------|
| Duty Free | 3.15 | Duty Paid | 4.65 |
|-----------|------|-----------|------|
45594. **Electrometer, Dolezalek Pattern**, same as No. 45588 but with a 50% higher sensitivity.
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 46.50 | Duty Paid | 68.20 |
|-----------|-------|-----------|-------|
45596. **Electrometer, Dolezalek Pattern**, same as No. 45588 but with silvered quartz fibre suspensions, increasing the sensitivity about 100%. Price on application.
45598. **Electroscope, Double-tilted Pattern, Bumstead**. The two plates attached to the terminals are charged to equal the opposite potentials, usually 200 volts, and the gold leaf kept vertical and central by means of levelling screws. The sensitiveness and stability are easily altered by raising or lowering the leaf by means of the fine adjustment provided. This instrument has a sensitivity about three times that of the ordinary tilted form listed below for equal stability. The plates are insulated with ambroid and an earthing terminal is fitted into the case. The insulation of the leaf is ambroid. See *American Journal of Science*, December, 1911.

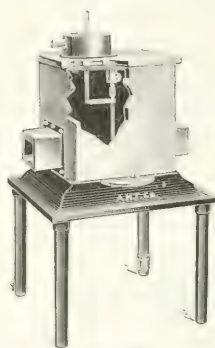


No. 45600

- |           |       |
|-----------|-------|
| Duty Free | 21.00 |
| Duty Paid | 30.80 |
45600. **Electroscope, Rectangular Tilted Pattern, Wilson**, with ebonite insulation and ambroid insulation to the leaf. Complete on stand with levelling screws.
- |           |       |
|-----------|-------|
| Duty Free | 12.00 |
| Duty Paid | 17.60 |
45602. **Electroscope**, as above, but with reading microscope with fifty division scale in ocular.
- |           |       |
|-----------|-------|
| Duty Free | 24.00 |
| Duty Paid | 35.20 |



No. 45650

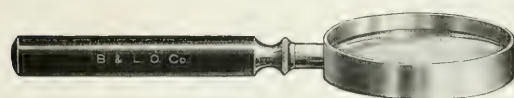


No. 45658



No. 45668

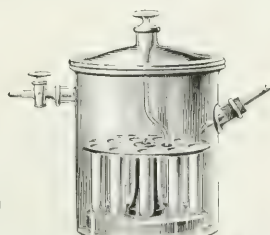
45650. **Electroscope, Alpha Ray, Rutherford**, consisting of aluminum about 4 inches cube, with optical glass windows, removable gold leaf system, two circular tables, sulphur insulations, on cast iron base. Designed for the accurate comparison of radio-activities measurable by the Alpha ray. Without reading microscope.  
Duty Free..... 20.75      Duty Paid..... 27.10
45654. **Electroscope, Alpha Ray, Rutherford**, as above with Tele-Microscope with scale.  
Duty Free..... 40.60      Duty Paid..... 52.90
45658. **Electroscope, Beta and Gamma Ray, Rutherford**, consisting of an aluminum box with removable lid, lined with lead throughout, lead slides at bottom and with thin aluminum window, with quartz insulations. Mounted on four legs, one of which is adjustable. When the instrument is used for the measurement of the Gamma ray only the aluminum aperture beneath the leaf is closed by the lead slide. Without reading microscope.  
Duty Free..... 24.00      Duty Paid..... 31.25
45660. **Electroscope, Beta and Gamma Ray, Rutherford**, as above, with Tele-Microscope with scale.  
Duty Free..... 43.75      Duty Paid..... 57.00
45664. **Electroscope, Alpha, Beta and Gamma Ray, Rutherford**, fitted with Tele-Microscope with scale in eyepiece, rack and pinion table, upper box lined with lead on one side and with thin aluminum plate on opposite side, with quartz insulations, etc.  
Duty Free..... 69.30      Duty Paid..... 90.30
45668. **Electroscope, Emanation, Rutherford**, of variable capacity for the measurement of emanations from radio-active bodies and also to detect the presence of both Thorium and Actinium emanations. If a stream of air conveying the emanation under investigation is passed through the electroscope, the variation in the rate of movement of the gold leaf when the current of air is stopped indicates at once the nature of the emanation present. If the rate of movement increases with time, the Radium emanation is present; if it falls to half value in 54 seconds, the Thorium emanation is present; and if it practically disappears in the course of 20 seconds, the discharge is due to the Actinium emanation. When it is required to determine the amount of Radium emanation in a solution, the latter is boiled to drive off the emanation and the gases mixed with emanation are collected over hot water and introduced into the partially exhausted electroscope. Air is then let in, and the pressure raised to atmospheric value. The rate of discharge of the electroscope increases rapidly after the introduction of the Radium emanation and reaches a maximum value after about three hours, and then slowly decays with a half value period of 3.86 days. Measurements of the rate of discharge are made either at a certain definite time after the introduction of the emanation, or preferably three hours after its introduction, and the rate of movement of the gold leaf (corrected for the natural leak) is a measure of the amount of emanation introduced. The electroscope is standardized by means of a Radium Standard Solution, containing about one-millionth of a milligram of Radium. The Radium in the form of solution is kept in a sealed flask and one month after sealing the amount of emanation reaches its equilibrium value. The Radium Solution is then boiled and the emanation transferred, as before, into the electroscope and the rate of movement measured under definite conditions. In an apparatus of this kind the emanation from  $10^{-8}$  of a milligram of Radium gives a comparatively rapid rate of movement; a quantity corresponding to  $10^{-7}$  milligram can easily be measured, while  $10^{-8}$  milligram produces a detectable effect. The apparatus consists of a cylindrical chamber of brass closed at either end and provided with inlet and outlet tubes and having a capacity of about one liter. Fitted to the upper end of the cylinder is an insulated plug of special design, having an extremely small natural leak, and so arranged as to be quite tight against a high rate of exhaustion in the vessel beneath. Attached to above plug is a small brass rod of about one millimeter diameter the lower end reaching to within one or two millimeters of the bottom of cylinder; to the upper end is attached the gold leaf system in upper cylindrical cover and viewed through the windows as shown. The upper cylindrical cover of brass is fitted with a variable capacity device by means of which the capacity may be increased two or three times, this being effected by using two circular plates, one attached to the leaf support and the other to the end of adjustable rod, shown at right of illustration.  
Duty Free..... 34.65      Duty Paid..... 45.15
45672. **Electroscope, Emanation, Rutherford**, as above, with Tele-Microscope with scale.  
Duty Free..... 54.45      Duty Paid..... 70.95



No. 45700



No. 45736



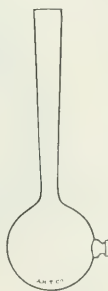
No. 45708



No. 45712



No. 45716



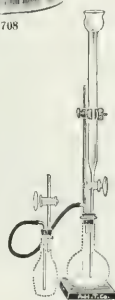
No. 45720



No. 45724



No. 45728



No. 45732

45700.	Reading Glasses in nickel plated mount, with handle of ebonized wood.									
	Diameter of lens, inches.....	2	2½	3	3½	4	4½	5	5½	6
	Focus, inches.....	5	6	7	8	10	12	13	14	15
	Each.....	.60	.80	1.00	1.50	2.00	2.25	2.50	3.00	3.50
45708.	Receiver, Bruhl, for distillations in vacuum, with ground on lid, ground in stopper at top and one ground stopcock at side. With support for reagent glasses and with reagent glasses.....									8.00
45712.	Receiver, Gautier, for distillations in vacuum, large model.....									4.00
45716.	Receivers, of glass, plain.									
	Capacity, cc.....							500		1000
	Each.....							.25		.35
45720.	Receivers, of glass, with tubulature.									
	Capacity, cc.....	100		250		500		1000		2000
	Each.....	.18		.24		.40		.45		.60
45724.	Receivers, of glass, with tubulature and ground in glass stopper.									
	Capacity, cc.....	100		250		500		1000		2000
	Each.....	.30		.40		.50		.60		.70
45728.	Reductor, Jones, for the determination of phosphorous by a rapid method as described in Blair's "Analysis of Iron, 5th Edition, p. 93. Tube only, with glass stopcock.....									2.00
45732.	Reductor, Jones, same as No. 45728 but with support, clamp, two flasks, glass stopcocks and rubber tubing.....									6.00
45736.	Reduction Tubes, of Hardest Bohemian Combustion Tubing, with one or more bulbs in center, as shown in illustration.									
	Number of bulbs.....						1	2		3
	Length, mm.....						300	350		400
	Each.....						.22	.30		.35

# REFRACTOMETERS.

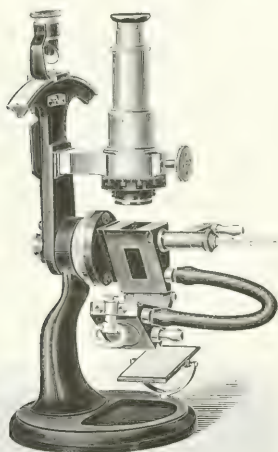
**REFRACTOMETERS, ZEISS.** The use of the Refractometer in its various forms in the modern chemical laboratory has increased with great rapidity. We recommend those who are not familiar with the construction or use of these instruments to apply to us for the following literature published by the firm of Carl Zeiss.

- Mess 160. Optical Measuring Instruments.  
 " 165. Dipping Refractometer.  
 " 172. Abbe Refractometer.  
 " 173. Butter Refractometer.  
 " 188. Pulfrich Refractometer.  
 " 245. Interferometer for Gas and Water.

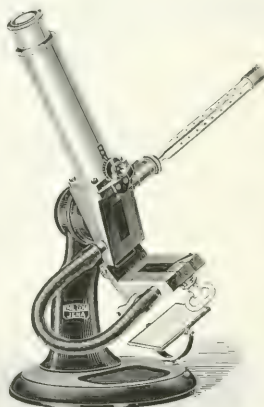
- Mess 292. New Sugar Refractometer.  
 " 186. Use of the Abbe Refractometer in the Sugar Industry.  
 " 189. Dr. Wagner's Tables regarding the Immersion Refractometer.

and particularly for the list of refractometrical literature, which has become too extensive to refer to in this description, all of which are sent free of charge.





No. 45760



No. 45764



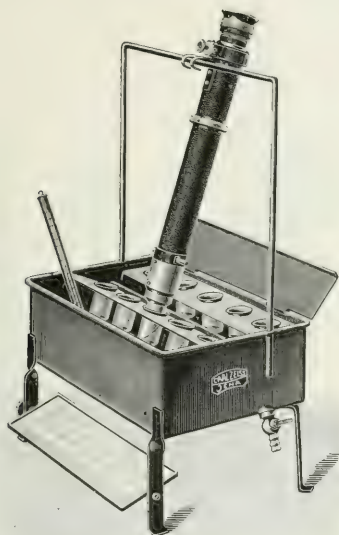
No. 45772



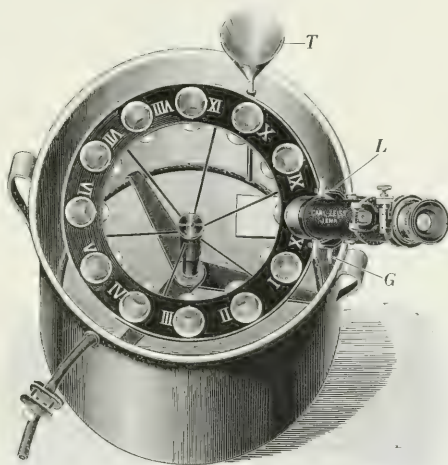
No. 45780

- 45760. Refractometer, Abbe, Zeiss, with Heatable Prism,** for the determination of refractive indices between  $n_D = 1.3$  and  $n_D = 1.7$  in fluid, plastic and solid bodies. The refractive index is read directly from the graduated circle. This instrument has found wide application in tests as to purity, the determination of the proportion of known components in a mixture and in the analysis of food products, particularly butter, cheese, margarine, cocoa fat, lard and other comestible fats; of salad oils, cod-liver oil, lubricants, alkalies, linseed oil, varnish, turpentine, petroleum, paraffin, ceresin and other kinds of wax; glycerine, aniline; aqueous, alcoholic and ethereal solutions as, for instance, the solution of ether and milk-fat adopted in Naumann's method of determining the percentage of fat in milk; milk serum; and for determining the quantity of albumen in blood serum in clinical work. The Abbe Refractometer with heatable prisms may also be used for the purposes for which the Butter Refractometer and the Milk Fat Refractometer were originally intended by use of the conversion tables furnished with each instrument and the two special thermometers which are usually supplied only with the Butter and Milk Fat Refractometers. The accuracy in measurement is to about two units of the fourth decimal place. In case with Table of Dispersion and Conversion Tables, and stem thermometer divided in single degrees from  $0-75^\circ \text{C}$ .
- |           |        |       |        |
|-----------|--------|-------|--------|
| Duty Free | 100.90 | Stock | 137.30 |
|-----------|--------|-------|--------|
- 45764. Refractometer, Butter, Zeiss,** for preliminarily testing butter refractometrically, also for investigating fats, salad oils, etc.; scope of the ocular scale from  $n_D = 1.42$  to  $n_D = 1.49$ ; micrometer screw for measuring the tenths of a division of the scale, accuracy in measurement one unit of the fourth decimal. With a small flask of "standard fluid" for the revision of the adjustment of the ocular scale, a table for converting the scale divisions into refractive indices. In case, with ordinary thermometer in  $\frac{1}{2}^\circ$  from  $0-50^\circ \text{C}$ ., with screw joint connection for attaching to the Refractometer.
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 50.90 | Stock | 69.30 |
|-----------|-------|-------|-------|
- 45768. Refractometer, Milk Fat, Zeiss.** This Refractometer resembles externally the Butter Refractometer and in both construction and manipulation is the same. The essential difference between the two consists in the range, and in the case of the Milk Fat Refractometer is from  $n_D = 1.33$  to  $n_D = 1.42$ , while the Butter Refractometer is from  $n_D = 1.42$  to  $n_D = 1.49$ . The Milk Fat Refractometer has an accuracy in measurement to one unit of the fourth decimal. Complete in case, with table for conversion of scale divisions into refractive indices and vice versa, and including correction thermometer to reduce the observations to  $17.5^\circ \text{C}$ .
- |           |       |       |       |
|-----------|-------|-------|-------|
| Duty Free | 53.88 | Stock | 73.27 |
|-----------|-------|-------|-------|
- Accessories for Above Refractometers.**
- |        |   |           |      |       |      |
|--------|---|-----------|------|-------|------|
| 45772. | Stem Thermometer, only, $0-75^\circ \text{C}$ . in single degrees   | Duty Free | .90  | Stock | 1.80 |
| 45776. | Wolny Special Thermometer, with butter and lard scales, with screw joint connection for attaching to the Refractometer  | 1.38      | 2.25 |       |      |
| 45780. | Baier Special Thermometer, with scales for summer butter, winter butter and lard, with screw joint connection for attaching to Refractometer                          | 1.81      | 3.65 |       |      |
| 45784. | Correction Thermometer, for milk fat investigations to reduce the observations to $17.5^\circ \text{C}$ ., with screw joint connection for attaching to Refractometer | 1.38      | 2.25 |       |      |

**Note**—Unless otherwise specified the above Refractometers are always supplied with the stem thermometer, as above listed.



No. 45788

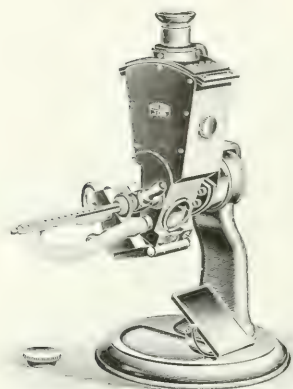


Nos. 45808 to 45811

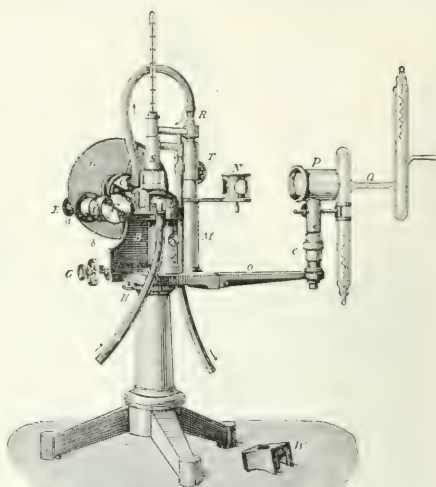
45788. **Refractometer, Dipping, Zeiss, for Investigating Fluids of Low Refractive Index, especially dilutions, alcoholic, volatile solutions, etc.;** scope of the ocular scale from  $n_D = 1.325$  to  $n_D = 1.367$  with an accuracy in measurement to one-third unit of the fourth decimal. In above illustration the refractometer hangs on the wire frame with its lower end, the prism, immersed in one of the glass beakers filled with the solution to be tested, the beakers being surrounded by flowing water at the required temperature. A rectangular mirror below the trough reflects the light from below through a glass plate into one of the rows of glass beakers. Because of its accuracy and extremely simple operation, the Dipping Refractometer has become an indispensable instrument in the examination of various products as to their purity, analysis of standard solutions, and to the rapid and very exact determination of the concentration of solutions. Dr. B. Wagner's tables of various substances which have been investigated by means of the Dipping Refractometer are recommended for use in connection with it (Price \$5.00). Complete in case, with free standing refractometer prism of acid-proof glass, with attachable beaker for the investigation of quickly evaporating solutions and with a table for the conversion of the scale readings into refractive indices, but without Auxiliary Prism, heating trough or thermometer. Duty Free ..... 62.50 Stock ..... 85.00

#### Accessories for the Dipping Refractometer.

45792. **Auxiliary Prism** for investigating fluids in very small quantities, for deeply colored solutions, such as molasses, dark beers, etc., and for the determination of albumen in blood serum. With unpolished surface of contact slightly countersunk. Duty Free 3.00 Stock 4.08
45796. **Heating Trough**, as shown in illustration of No. 45788, for the reception of 12 glass beakers, each containing 20 cc, for investigations in bulk, with a glass plate at the bottom of the trough and mirror below, and with 24 beakers. 7.50 10.20
45800. **Thermometer**, 15-25° C. divided in  $\frac{1}{10}$ ths, in metal case, with certificate of accuracy. 4.25 6.12
45804. **Stem Thermometer**, 15-25° C., divided in  $\frac{1}{10}$ ths, about 8 cm long, with a red line at 17.5° C. .56 .81
- Tempering Bath**, for use without a continuous flow of water, recommended when the Refractometer is only used occasionally and for investigations at indoor temperatures. The construction of this bath is based on the fact that a large volume of water with a comparatively small surface area is very slow in acquiring the temperature of the surrounding space. The outfit consists of the following:—
45808. **Enamelled Pan**, of about 10 liters capacity, with felt jacket and over-flow joint, 1 meter of rubber tubing and stopcock. Duty Free 3.88 Stock 5.58
45809. **Filler**, for uniformly introducing fresh water into the pan without stirring, with funnel. 1.25 1.70
45810. **Carrier (L)** for Refractometer, with mirror. 6.06 8.25
45811. **Umbrella Frame**, for 12 beakers of 20 cc capacity; and with 24 beakers. 6.63 9.01



No. 45812

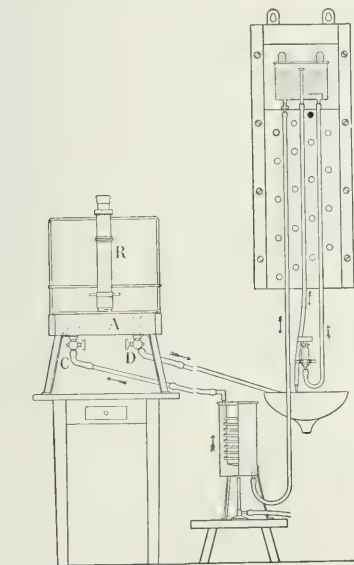


No. 45828

**REFRACTOMETER, SUGAR, ZEISS**, a new and special adoption of the Abbe Refractometer for the sugar industry. The wide adoption of the refractometric method of determining dry solids in sugar factory products has resulted in a simpler model of the Abbe Refractometer (heretofore widely used in the sugar industry), constructed with the coöperation of the Physikalisches-Technische Reichsanstalt and the International Commission for Uniform Methods of Sugar Analysis. A distinct improvement is in the prism which is an Abbe double prism made of lighter flint glass and which gives a more open scale than the prism used in the Abbe Refractometer and which noticeably reduces the error in the refraction quotient. The scale reads directly in percentages of dry substance and is now in the field of the telescope and is divided from 0-50 for whole percents and from 50-85 for half percents of dry substances. With this new instrument the darkest ordinary molasses may be accurately tested directly, without dilution. The instrument is adjusted regularly for 20° C. but, when intended for use in tropical countries, is adjusted for 28° C., the temperature of adjustment being engraved on each instrument.

45812.	Refractometer, Sugar, Standard Model, as above, adjusted for 20° C., with special thermometer from 0 to 50 in $\frac{1}{2}^{\circ}$ with screw mounting.		
	Duty Free.....	75.90	Stock..... 103.22
45816.	Refractometer, Sugar, Tropical Model, adjusted for 28° C., with special thermometer as above.		
	Duty Free.....	75.90	Stock..... 103.22
45820.	Thermometer, only, 0 to 50°C in $\frac{1}{2}^{\circ}$ , with screw mounting.		
	Duty Free.....	.90	Stock..... 1.30
45824.	Thermometer, only, as above, with fixed metal case.		
	Duty Free.....	1.25	Stock..... 1.80
45828	Refractometer, Pulfrich, Zeiss, designed for measurements of refraction ( $n_D$ ) and dispersion (difference of indices for the Fraunhofer lines C D F and G <sup>1</sup> ) of transparent, fluid and solid bodies, either single or double refracting; investigations of fluids at high temperatures, including bodies that are fluid only under such conditions; and the determination of the differences of refractive or dispersive power of such solid or fluid substances as differ but little in their optical properties. (The instrument is then used as a differential refractometer.) In the construction of the accessories which serve for the purposes mentioned above, special attention has been given to securing simplicity in the methods of observing and in the subsequent computations. All parts of the apparatus are, therefore, permanently fixed in position after being once properly adjusted, and hence are always ready for use. The computations for dispersion and other differential quantities from the data given by the observation are made by means of suitable tables in the same manner as hitherto for $n_D$ without the use of logarithms. In regard to accuracy the apparatus is designed to meet the requirements which are usual in spectrometric measurements, i.e., exactness to a single unit of the fourth decimal place in the refractive index and to one or two units of the fifth decimal place in the dispersion and other quantities depending upon differential measurements. With Geissler tube, cabinet for the instrument and case for the prisms and accessories, and detailed directions for use, but without prisms or heating apparatus.		
		Duty Free	Duty Paid
		118.75	161.50
<b>Accessories for Pulfrich Refractometer.</b>			
45832.	Geissler Tube, with H-filling.....	2.00	2.88
45836.	Prism I ( $n_D=1.62$ ), for the determination of fluids having refractive indices varying from that of water $n_D=1.33$ to $n_D=1.61$ ; including mount, carrier and cemented glass cell.....	12.50	18.00
45840.	Prism II ( $n_D=1.75$ ) for the examination of solid substances (glasses, etc.) having refractive indices varying from $n_D=1.47$ to $n_D=1.74$ ; including mount and carrier.....	14.25	19.44

45844.	Barium Mercuric Iodide solution ( $n_D=1.78$ ) specific gravity=3.6, about 35 grams	Duty Free .63	Duty Paid .90
45848.	Prism III, for substances of exceptionally high refractive power, having refractive indices varying from $n_D=1.64$ to $n_D=1.88$ ; including mount and carrier	17.50	25.20
45852.	Tube, 5 mm inside diameter, for the investigation of very small quantities of fluid	1.25	1.80
45856.	Prism IV ( $n_D=1.62$ ) for the differential examination of fluids, with mount, carrier and cover	18.00	25.92
45860.	Prism V ( $n_D=1.75$ ) for the differential examination of fluids, with mount, carrier and cover	22.00	31.68
45864.	Heating Apparatus	13.75	18.70
45868.	Thermometer, from 0 to 75° C., in single degrees, with screw for fitting into the heating apparatus	.90	1.30
45872.	Thermometer, 0-50° C., divided in $\frac{1}{10}$ ths, with screw	4.00	5.76
45876.	" 50-100° C., divided in $\frac{1}{10}$ ths, with screw	5.00	7.20
45880.	Sodium Burner	3.63	4.93
45884.	Fluid Cell, with plano-parallel bottom ( $n_D=1.65$ ), glass stopper and thermometer for the investigation of fluids on a prism, on which a glass tube is not cemented	4.50	6.48
45886.	Glass Dish, for cementing the glass cells	1.25	1.80
45888.	Capped Bottle, with glass rod for the application of drops	.25	.36
45890.	Monobromide of Naphthalene ( $n_D=1.65$ ), as an immersion fluid for the investigations of glasses, etc., about 10 grams	.13	.18
45892.	Potassium Mercuric Iodide, solution, ( $n_D=1.72$ ), specific gravity=3.1, about 35 grams	.50	.72
45894.	Refractometer, Pulfrich, Zeiss, with complete outfit, suitable for ordinary physical and chemical investigations as follows:— Pulfrich Refractometer, 1 extra Geissler Tube, Prisms I, II and IV; Heating Apparatus, Thermometer 0-75° C. in single degrees, Thermometer 0-50° C., in $\frac{1}{10}$ ths; Thermometer 50-100° C., in $\frac{1}{10}$ ths; Spiral Heater. Water Pressure Regulator, 2 Capped Bottles, with glass rods; 1 bottle of Monobromide of Naphthalene, Glass Dish, Sodium Burner.	Duty Free 212.90	Duty Paid 289.54



No. 45908

**Spiral Hot Water Heater with Water Pressure Regulator** for use with any Zeiss Refractometers. The Dipping Refractometer as shown in No. 45788 with heating trough may, in many investigations, be used without a Spiral Heater and Water Pressure Regulator, it being sufficient to allow the water at the temperature of the room to flow slowly through the heating trough from a tank suspended up on the wall. Where it is necessary to maintain a given temperature for hours at a time to within a few tenths of a degree as, for instance, in Dr. Ackermann's rapid method for the estimation of alcohol and extract in beers, either a Tempering Bath No. 45808 or the Spiral Heater and Water Pressure Regulator must be used.

45908.	Spiral Heater, with support and Bunsen burner	Duty Free 15.25	Duty Paid 20.74
45912.	Cistern A, of Water Pressure Regulator	1.75	2.52
45916.	Cistern B, of Water Pressure Regulator	1.25	1.80

**Note**—Where the Water Pressure Regulator is to be used with an Abbe or Pulfrich Refractometer, the complete Water Pressure Regulator with Cisterns A and B is required.



Percent Sugar Table According to Refraction Indices with the Sugar Refractometer.

Refraction Exponent	Schönrock	Main	Tolman and Smith	Prinsen-Geerligs	Hübener
1.3403	5%	5.2%	5.0%	5.0%	5.1%
1.3479	10	10.2	10.1	10.1	10.0
1.3557	15	15.2	15.1	15.1	15.0
1.3639	20	20.1	20.1	20.2	20.0
1.3723	25	25.1	25.1	25.1	
1.3811	30	30.0	30.1	30.0	
1.3902	35	35.0	35.0	35.0	
1.3997	40	40.0	40.0	40.1	
1.4096	45	45.0	45.0	45.0	
1.4200	50	50.0	50.0	50.0	
1.4307	55	55.1	55.0	54.9	
1.4418	60	60.0	60.0	59.9	
1.4532	65	64.9	64.9	65.0	
1.4651		75	69.9	69.8	
1.4774		70	74.9	74.7	
1.4901		80	79.9	79.9	
1.5033		85	85.0	84.9	

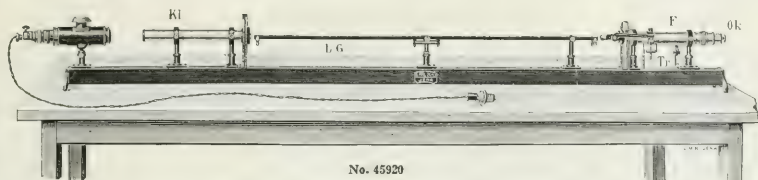
The first column in the above table shows the refraction quotient for sodium light in air at 20° C. and the second the corresponding sugar percents, i.e., the number of grams of sugar in 100 grams of pure sugar solution, calculated according to Schönrock. The remaining columns give the sugar percents for the corresponding refractive indices of the first column according to the calculations of Main, Tolman and Smith, Prinsen-Geerligs and Hübener, the value of Prinsen-Geerligs being transposed from 23° to 20° C. The variations in these tables (the first having been determined in Charlottenburg, the second in London, the third in Washington, the fourth in Java and the last in Halle) are within the limits of error permitted by the sugar trade.

## DR. EMIL REISS' TABLE

for direct calculation of the Scale Divisions, percentage of Albumen, at 17.5° C. with the Dipping, Refractometer.

As this table is in frequent demand in Clinical Laboratories, but is otherwise somewhat difficult of access we are enabled, by the author's kind permission, to reproduce it in full.

Refractive Indices corresponding to Scale Divisions	Blood Serum			Exudations and Excretions		
	n <sub>D</sub> for Dist. Water		1.33320	n <sub>D</sub> for Dist. water		1.33320
	Δ n <sub>D</sub> for Non-albuminous matter		0.00277	Δ n <sub>D</sub> for Non-albuminous matter		0.00244
	Δ n <sub>D</sub> for 1% Albumen		0.00172	Δ n <sub>D</sub> for 1% Albumen		0.00184
	Scale Divisions	Percentage Albumen	Diff. of Albumen for 1 Scale Div.	Scale Divisions	Percentage Albumen	Diff. of Albumen Scale for 1 Div.
1.33590	22			22	0.14	
1.33628	23			23	0.35	— 0.210
1.33667	24			24	0.56	— 0.210
1.33705	25	0.63		25	0.77	— 0.210
1.33896	30	1.74	— 0.220	30	1.80	— 0.206
1.34086	35	2.84	— 0.220	35	2.83	— 0.206
1.34275	40	3.94	— 0.218	40	3.86	— 0.206
1.34463	45	5.03	— 0.218	45	4.89	— 0.202
1.34650	50	6.12	— 0.216	50	5.90	— 0.202
1.34836	55	7.20	— 0.216	55	6.91	— 0.202
1.35021	60	8.28	— 0.214	60	7.92	— 0.200
1.35205	65	9.35	— 0.212	65	8.92	— 0.198
1.35388	70	10.41		70	9.91	



No. 45920  
Laboratory Interferometer (about  $\frac{1}{10}$  Full size). Kl = Collimator. L, G = Air and Gas Chambers. F and Ok = Reading Telescope.

**REFRACTOMETER (GAS AND WATER INTERFEROMETER) ZEISS**, a new instrument for the optical analysis of gas and water developed at the Zeiss works in coöperation with Prof. Haber, of Berlin, consisting of a modification of Lord Rayleigh's type of apparatus wherein readings are taken by means of a system of optical compensation instead of by a pressure gauge, affording a much more rapid and convenient means of working and which improvement permits the construction of the instrument in a portable form. The Gas Refractometer is made in two ranges of accuracy, the first known as the Laboratory Interferometer reading the per cent of  $\text{CO}_2$  to within 1/50% to 1/100%, and the Portable form reading to within  $\frac{1}{10}$ % to  $\frac{1}{2}$ % of  $\text{CO}_2$ .

#### Purposes for which the Gas Interferometer is available.

The Gas Interferometers serve for ascertaining the difference between the refractive indices of a given gas and a standard gas. The method of optical analysis is directly applicable to all binary mixtures of gases, i.e., all mixtures of two gases, which includes all commercially pure gases, such as oxygen, nitrogen, hydrogen, carbon dioxide, etc., provided the given gas is contaminated by only one other gas which is known from the nature of the process of manufacture. In this connection binary mixtures of gases may also take the form of a primary mixture of unvarying composition and a quantitatively variable component, i.e., normal air containing an admixture of a gas, such as carbon dioxide, chlorine, or acetylene; and, where the initial fuel was known, also flue gases which do not contain carbon monoxide may be regarded as binary mixtures of theoretical flue gas and an excess of air.

Finally, the method applies to all mixtures from which one or more components can be easily removed by quantitative absorption. A case in point is that of flue gases containing carbon monoxide. To determine the percentage of carbon dioxide in a mixture of this kind one of the gas chambers may be filled with dried flue gas, the other with dried flue gas freed of its  $\text{CO}_2$ , when the reading will give the proportion of  $\text{CO}_2$  present in the mixture. Similar cases arise in the examination of gaseous products occurring in the intermediate stages of chemical processes of manufacture.

The Gas Interferometers are now being used for the technical as well as scientific analysis of gases in connection with a great variety of experimental investigations carried on in laboratories attached to mines, experimental borings, chemical works manufacturing commercially pure compressed gases and others having to control the composition of gases occurring as intermediate products, public health offices and medical institutes for the systematic analysis of air, steam users' associations, and institutions devoted to researches in physics and physical chemistry. We shall be pleased to provide further information and suggestions respecting the application of the apparatus.

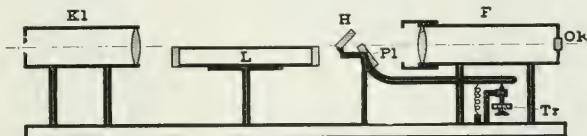


Fig. 3

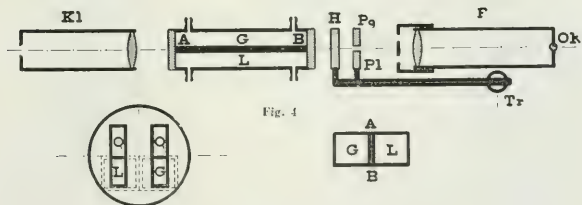


Fig. 4

**Diagrammatic View (Fig. 3; Elevation; Fig. 4; Plan) of the Laboratory Interferometer.** The parallel pencil of rays which proceeds from the collimator Kl splits up, the upper half passing over the gas chamber (Fig. 3) and through the auxiliary plate above the compensator Pl, next through the double slit (Fig. 4) into the telescope F, whilst the lower half passes partly through the gas chamber G, and partly through the air chamber L, thence under H, through the compensator plates P<sub>g</sub> and P<sub>l</sub> respectively, and through the double slit into the telescope F. The resulting diffraction spectra are seen in the eyepiece Ok. The micrometer screw with its drum Tr serves for turning the compensator plate Pl, whereas P<sub>g</sub> is stationary.

# Applications of the Water Interferometer

The Water Interferometer is susceptible of a degree of accuracy which is 5 to 50 times greater than that of the Dipping Refractometer and is primarily intended for the rapid testing of natural waters. In the case of river water it serves for ascertaining the proportion of salts which enter rivers with the waste waters discharged by manufacturing establishments and which under local regulations are not allowed to exceed a certain percentage.

The Interferometer furnishes a convenient means of ascertaining the course of flowing subsoil water from the analysis of the samples.

The instrument furnishes, to quote another instance of its utility, a convenient means of continuously controlling the water supplied by mineral springs, wells, or storage basins. Water contained in engine boilers can be tested on the spot within a few minutes with respect to the whole of the salts present in solution.

The analysis of seawater, as required for oceanographic purposes, demands a degree of accuracy which can only be attained with the aid of volumetric analysis by titration immediately after the sample has been obtained, that is, on board. The Water Interferometer has from the outset been so designed as to be available for use on board, and, with a short water chamber, furnishes readings which are quite as exact as those obtainable by the method of titration, while when used with its longest water chamber it can be applied for minute investigations such as hitherto could not be thought of. Moreover, owing to the high degree of accuracy of which the Water Interferometer is capable very sparingly soluble substances have now been made to yield to the refractometric method of analysis, i. e., alkaloids, minerals, colloids, and other extremely dilute solutions, which previously could only be dealt with physically by measuring their electric conductivity.

The Water Interferometer is, in fact, a convenient and accurate water analyzer and as such admirably adapted for the permanent control of drinking water, river water, and the waste waters discharged by factories, and should prove valuable to water boards, public analysts, and others whose duty it is to test water systematically; for use in oceanographic laboratories and in connection with marine expeditions, and last but not least, for the equipment of laboratories appointed for researches in physics, physical chemistry, and mineralogical chemistry.

For more complete description write for a copy of *Zeiss Mikro 245* and see the following references, copies of which can be mostly sent on application.

## The Gas Refractometer.

1. F. Haber, *Zeitschrift für angew. Chemie*, 19, p. 1717, 1906.
  2. F. Haber, *Zeitschrift für Elektrochemie*, 13, p. 460, 1907.
  3. L. Stuckert, *Zeitschrift für Elektrochemie*, 16, p. 37, 1910.
- Bulletin No. 12, U. S. Bureau of Mines.  
Rayleigh's Interferometer (original arrangement).  
Lord Rayleigh, *Proc. Royal Soc.*, 59, p. 201, 1896; p. 97, 1898.  
Ramsay und Travers, *Proc. Royal Soc.*, 62, p. 225, 1897; 64, p. 190, 1898, and 67, p. 531, 1900.  
E. A. J. Cananous, *Zeitschrift für physik. Chemie*, 36, p. 233, 1902.

C. G. Gerrits, Thesis, Amsterdam, 1904.

Dr. Travers' book *Study of Gases* 1901 published by Messrs. Macmillan and Co., St. Martins Street Leicester Square, London W.C.

## Rayleigh's Laboratory Interferometer (new type).

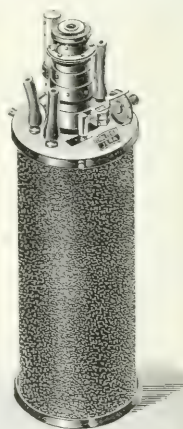
L. Stuckert, *Zeitschrift für Elektrochemie*, 16, p. 37, 1910.  
F. Haber and F. Löwe, *Zeitschrift für angew. Chemie*, 23, p. 1593, 1910.

## Portable Interferometers for gas and water.

F. Löwe, *Physikalische Zeitschrift*, 11, p. 1047, 1910.  
F. Löwe, *Zeitschrift für Instrumentenkunde*, 30, p. 321, 1910.  
L. von Klemperer, *Chemiker-Ztg.* 35, p. 557, 1911.



Water Interferometer No. 45961 is identical in appearance with Portable Gas Interferometer No. 45948



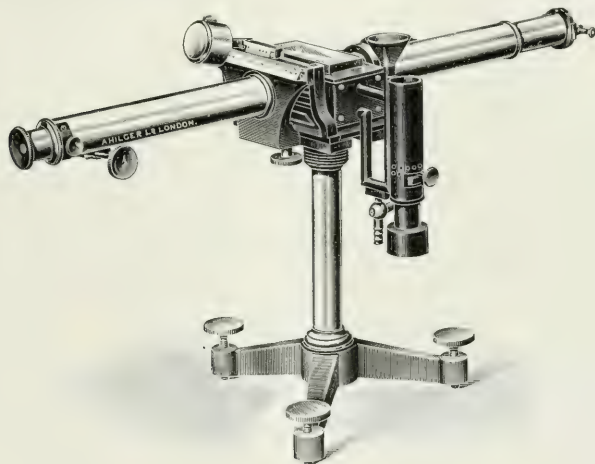
No. 45948—Portable Gas Interferometer with hood

No. 45948—Portable Gas Interferometer without hood

45920. Laboratory Interferometer, Zeiss, with standard 10 cm wide, 20 cm high and 200 cm long. The gas to be examined and the standard gas are each contained in a chamber 100 cm long with a cross section of 1 sq. cm, making the capacity of each chamber 100 cc. In a gas chamber having a length of 100 cm the limit of error is similar to that obtainable by the exact method of analysis of gases in contact with mercury. Thus the percentage of carbon dioxide ( $\text{CO}_2$ ) or methane (firedamp  $\text{CH}_4$ ) can be ascertained with a degree of accuracy within 0.01 to 0.02%. With detachable gas chamber 100 cm long and cover, but without lamp.
- |                |        |            |        |
|----------------|--------|------------|--------|
| Duty Free..... | 125.00 | Stock..... | 170.00 |
|----------------|--------|------------|--------|

## Accessories for Laboratory Interferometer.

45924.	Nernst Lamp for a current of 100 volts, with extra burner, in fitting mounted on socket pin, with condenser, cable and plug switch for attachment to ordinary lamp fitting.....	Duty Free 15.00	Stock 20.40
45928.	Osram Lamp, 3.5 volts, with fittings and condenser, mounted on socket pin.....	6.25	8.50
45932.	Six additional Osram Lamps, only, without mounting.....	2.63	3.57
45936.	Accumulator, 4 volt, in wooden case, with switch and cable.....	8.75	11.90
45940.	Four-way Cock.....	1.13	1.53
45944.	Packing Case.....	4.00	5.44
45948.	Portable Gas Interferometer, Zeiss, consisting of an upright cylindrical pattern of about 10 cm diameter and 50 cm long, the only part which is detached from it being a small accumulator. With gas chambers 10 cm long it reads percentages of CO <sub>2</sub> or CH <sub>4</sub> with a degree of accuracy within 0.1 to 0.2%. The weight of the portable pattern is about 11 lbs. With interchangeable gas chamber 10 cm long and detachable protecting cover, including condenser and lamp fittings with 3.5 volt Osram lamp on condenser.		
	Duty Free.....	137.50	Stock..... 187.00
	Accessories for the Portable Gas Interferometer.	Duty Free	Stock
45952.	Interchangeable Gas Chambers, 2 or 5 cm long.....	13.75	18.70
45956.	Six additional Osram Lamps, only.....	2.63	3.57
45960.	Accumulator, 4 volt, in wooden box, with switch and cable.....	8.75	11.90
45964.	Water Interferometer, Zeiss, of exactly the same appearance as the Portable Gas Interferometer. In regard to accuracy it surpasses all Refractometers which have so far been in use for practical purposes and for ambulant research work. The water chambers are interchangeable and, according to their length, read the proportion of salt contained in a solution of NaCl, for instance, accurately within 0.03 to 0.003 per mille, and hence the instrument gives far more accurate results than the best readings obtainable with the pycnometer or by the methods of volumetric analysis. With an interchangeable water chamber $\frac{1}{2}$ , 1, 2 or 4 cm long and removable cover, including condenser and lamp fittings with 3.5 volt Osram lamp on condenser.		
	Duty Free.....	156.25	Stock..... 212.50
	Accessories for Water Interferometer.	Duty Free	Stock
45968.	Additional Water Chambers, each.....	18.75	25.50
45972.	Six Additional Osram Lamps, only.....	2.63	3.57
45976.	Accumulator, 4 volt, in wooden box, with switch and cable.....	8.75	11.90



No. 45980

45980. Refractometer, Fery, Hilger, a direct reading refractometer for taking the refractive index for sodium light of oils, solutions of acids, mixtures of glycerine, alcohols, etc., with water, sugar solutions, and other liquids of interest to the industrial chemist. This instrument possesses the following advantages:—

It reads direct the refractive index of any transparent liquid with a uniform accuracy of nearly 0.0001, from 1.3300 to 1.6726. The glass with which the liquid comes into contact is a crown glass, which resists to an exceptional degree the action of chemical reagents.

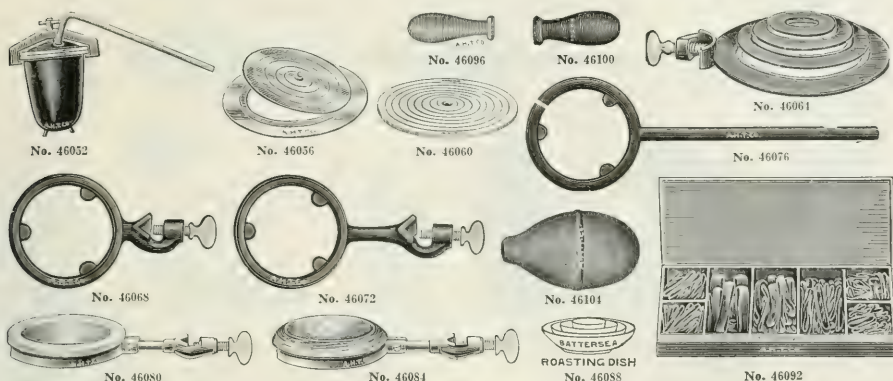
The temperature control is extremely simple and effective and forms an integral part of the apparatus.

The manipulation of the apparatus is extremely simple and convenient.

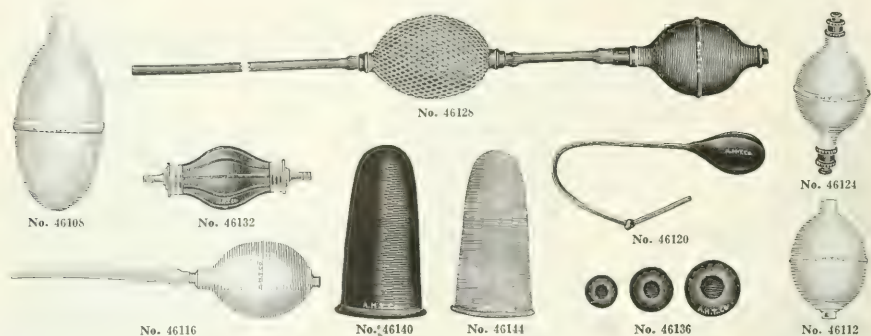
Duty Free..... 159.30                      Duty Paid..... 218.30



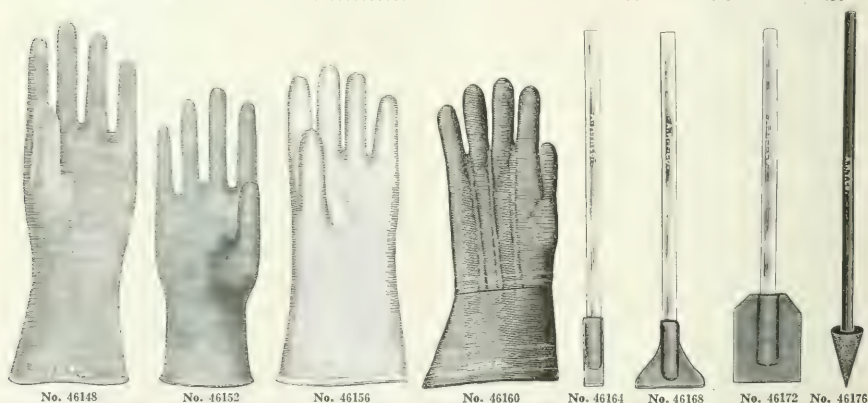




46052.	Retorts, Iron, for distilling mercury, etc., with removable cover fastened by screw clamp and with delivery tube ground into cover.				
	Capacity, cc.....	250	500	1000	2000
	Each.....	2.25	2.50	3.00	4.50
46056.	Rings, Concentric, Copper tinned inside, for water baths, etc., with cover.				
	Number in set.....	3	4	5	6
	Outside diameter of set, inches.....	4 $\frac{1}{2}$	5 $\frac{1}{4}$	6 $\frac{1}{2}$	8 $\frac{1}{4}$
	Per set.....	.60	.80	1.00	1.25
46060.	Rings, Concentric, Royal Berlin Porcelain.				
	Number in set.....	3	4	5	7
	Outside diameter of set, mm.....	74	94	115	156
	Per set.....	.80	1.20	1.65	2.70
46064.	Rings, Concentric, of japanned cast iron, with screw clamp on largest ring for attaching to upright support; outside diameter of largest ring 8 inches, with four rings in set. Per set.....				.75
46068.	Rings, Support, of japanned cast iron, with screw clamp with brass screw. Distance from center of support to center of rings 2 $\frac{1}{2}$ inches. Suitable for use on upright supports with tripod base and supports with rectangular base in the smaller sizes. When used on the same support rings will be concentric. Outside diameter, inches.....				2 $\frac{1}{2}$
	Each.....				.15
46072.	Rings, Support, similar to above but with distance from center of support to center of rings 4 $\frac{1}{2}$ inches. Suitable for use on supports with rectangular base in the three larger sizes. When used on the same support rings are concentric.				
	Outside diameter, inches.....	2 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	6 $\frac{1}{2}$
	Each.....	.15	.17	.20	.25
46076.	Rings, Support, of japanned iron, with straight extension bar 8 inches long. Distance from end of shank to center of rings 9 $\frac{1}{2}$ inches. A clamp holder such as No. 24518 is necessary when these rings are to be attached to an upright support.				
	Outside diameter, inches.....	2 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	6 $\frac{1}{2}$
	Each.....	.10	.12	.15	.20
46080.	Rings, Support, of brass with glazed porcelain inset, with screw clamp.				
	Outside diameter, mm.....		60	80	100
	Each.....		.45	.50	.55
46084.	Rings, Support, of brass, with wooden inset, with screw clamp.				
	Outside diameter, mm.....		60	80	100
	Each.....		.45	.50	.55
46088.	Roasting Dishes, Battersea.				
	Diameter, inches.....	3	4	5	6
	Per dozen.....	.80	.90	1.10	2.10
46092.	Rubber Bands, of pure gum, in boxes of seven assorted sizes. Per box.....				1.00
46096.	Rubber Bulb, of pure, acid-cured red rubber, as required in opsonic and serological work; about 2 cc capacity, as used in Dr. Wright's laboratories.....				.15
46100.	Rubber Bulbs, of pure black gum, for dropping pipettes, medicine droppers, etc.; superior quality.				
	Capacity, cc (approximate).....	2	3	5	
	Per dozen.....	.45	.50	.60	
	Per gross.....	4.80	5.50	6.75	
46104.	Rubber Bulbs, of red non-blooming rubber, stout walled, for pipettes.				
	Capacity, ounces.....	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$
	Length, inches.....	1 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{16}$
	Diameter, inches.....	$\frac{1}{8}$	$\frac{1}{16}$	$\frac{1}{32}$	$\frac{1}{64}$
	Each.....	.10	.12	.15	

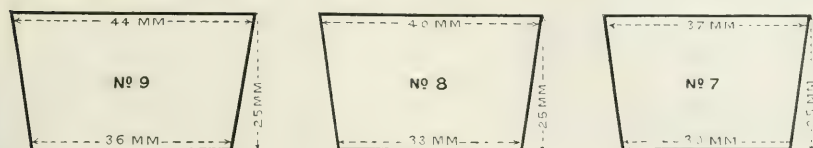


46108.	Rubber Bulbs, of white composition rubber, large size for large pipettes, etc.									
	Length, inches.....	3 $\frac{1}{2}$	3 $\frac{3}{8}$	4						
	Diameter, inches.....	1 $\frac{1}{8}$	1 $\frac{1}{16}$	1 $\frac{1}{2}$						
	Each.....	.20	.25	.30						
46112.	Rubber Bulb, with single valve, without extension tube, of white rubber 2 $\frac{1}{4}$ in. long by 2 in. diam.....	.25								
46116.	Rubber Bulb, with two valves, of white rubber, with 5 inches of tubing.....	.30								
46120.	" " of pure black gum, with long flexible tube, for use with gas analysis apparatus.....	.60								
46124.	" " with two valves, of hard rubber, giving the exhaust and pressure, i. e., the first compression of the bulb releases blast from one end, after which suction is produced from the opposite end when the bulb resumes its usual shape. As used in gas analysis, etc.....	.50								
46128.	Rubber Bulb, double, of pure black gum, with heavy silk net, for constant pressure.....	2.00								
46132.	" " of black acid-cured rubber, with double valve set in bone fittings.....	2.50								
46136.	Rubber Caps, for covering tops of test tubes, cylinders, etc., with rolled edges									
	Diameter, inches.....	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	3
	Per dozen.....	.45	.50	.52	.55	.60	.70	.85	.95	1.10 1.95
	Per gross.....	4.75	5.00	5.25	5.50	5.75	7.00	8.50	9.75	11.00 19.50
46140.	Rubber Finger Coats, of pure gum, heavy weight. Size.....				Small	Medium		Large		Thumb
	Per dozen.....	.75	.75	.75				.75		.75
46144.	Rubber Finger Coats, of thinnest rubber tissue, for surgical use.									
	Size.....				Small	Medium		Large		Thumb
	Per dozen.....	.50	.50	.50				.50		.50



46148.	Rubber Gloves, of pure gum, chocolate color, medium weight. Sizes 6 to 10. Please specify size in ordering. No. 8 or No. 9 is required for normal male hand. Per pair.....	1.75
46152.	Rubber Gloves, of thinnest pure gum tissue, smooth finish, as used by surgeons. Sizes 6 to 10. Please specify size in ordering. Per pair.....	1.35
46156.	Rubber Gloves, of heavy white rubber, so-called "acid gloves." Gloves measure 8 $\frac{1}{2}$ inches from tip of thumb to end of gauntlet. Sizes 8, 9 and 10. Per pair.....	3.00
46160.	Rubber Gloves, of medium weight black rubber, with thin cotton lining and widely used in leading hospitals and laboratories for post mortem work, handling of pathological material, etc., with gauntlet. Sizes 6 to 10. Per pair.....	2.50
46164.	Rubber Policemen, for washing down precipitates, narrow shape, with glass rod. Per dozen.....	1.00
46168.	Rubber Policemen, wing shape, with glass rod. Per dozen.....	1.00
46172.	" " new form, with glass rod. Per dozen.....	1.50
46176.	" " with hard rubber handle and soft, cone shaped tip. Each.....	.25

DIAGRAMS SHOWING EXACT SIZES OF THE MOST USED NUMBERS OF RUBBER STOPPERS  
No. 46180 REGULAR SHAPE

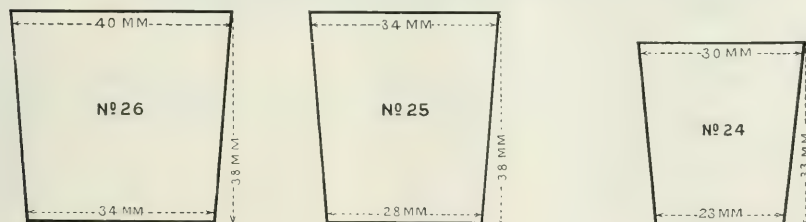


No. 46180—Exact Sizes

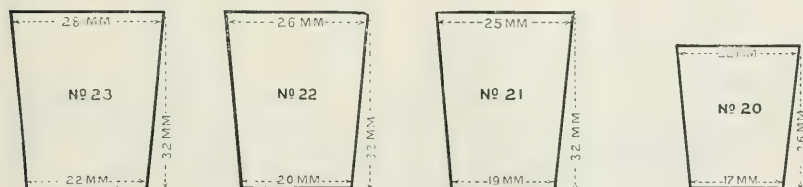


No. 46180—Exact Sizes

DIAGRAMS SHOWING EXACT SIZES OF THE MOST USED NUMBERS OF RUBBER STOPPERS  
No. 46188 EXTRA LONG SHAPE



No. 46188—Exact Sizes



No. 46188—Exact Sizes



46180. **Rubber Stoppers, A. H. T. Co. Special Quality**, made of selected stock containing a large per cent or pure Para gum and distinctly superior to the stoppers ordinarily sold as pure gum. Each stopper bears our trade mark. They are carried in stock as solid, one hole or two hole, which specification must be given with order. When no specification is given solid stoppers are sent. Exact size of each number of stopper is shown in the diagram.

Number.....	00	0	1	2	3	4	5	6
Diameter at top, mm.....	14	17	18	20	23	26	27	32
" bottom, mm.....	10	12	15	15	18	20	23	26
Number of solid stoppers per lb.....	109	72	51	49	36	30	24	19
Per lb.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Number.....	7	8	9	10	11	12	13	14
Diameter at top, mm.....	37	40	44	50	56	65	70	70
" bottom, mm.....	30	33	36	42	50	59	60	60
Number of solid stoppers per lb.....	14	12	10	7	6	4	4	4
Per lb.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

46184. **Rubber Stoppers**, same quality as No. 46180 but of red or antimony rubber. Sizes and numbers same as No. 46180. **Per lb.**..... 4.00

46188. **Rubber Stoppers**, exactly same quality as No. 46180, but new extra long shape.

Number.....	20	21	22	23	24	25	26	27
Diameter at top, mm.....	22	25	26	28	30	34	40	40
" bottom, mm.....	17	19	20	22	23	28	34	34
Number of solid stoppers per lb.....	38	27	23	20	18	11	7	7
Per lb.....	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00

**Note**—We furnish the ordinary pure gum stopper of the rubber trade on special order only at price very much lower than that charged for our special quality.

46192. **Rubber Stoppers**, for use with the official Brown Duvel Moisture Tester in stoppered glass and copper flasks. Made of a special composition to withstand high temperatures. See Bulletin 36 of the U. S. Bureau of Plant Industry. Size No. 5, one hole, **Per dozen**..... 1.25



No. 46200

46196. **Rubber Tissue**, or dental dam, per oz..... .35

46200. **Rubber Tubing, Thick Wall**, of pure black unvulcanized gum. This tubing is the best imported quality without any bloom and, for many purposes, is the best tubing made. For convenience and economy we have it put up in the European factory in neat circular boxes containing 10 ft. and 25 ft. lengths. Customers are encouraged to use these original packages as far as possible. On large quantities taken at one time we quote on application a price per pound somewhat lower than the price per foot.

Inside diameter, mm.....	3	4	5	6	8	9	12	15	18	25
Thickness of wall, mm.....	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
Per foot in less than original lengths.....	.07	.10	.12	.14	.30	.35	.60	.80	.90	1.65
Per foot in 10 or 25 ft. lengths.....	.06	.08	.10	.12	.26	.30	.50	.65	.75	1.40



No. 46204



No. 46208

46204. **Rubber Tubing, Thin Wall**, same quality as No. 46200.

Inside diameter, mm.....	1½	3	4	5	6	8	9	12
Thickness of wall, mm.....	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8
Per foot when cut in less than original lengths.....	.05	.06	.09	.10	.15	.18	.25	.35
Per foot in 10 or 25 ft. lengths.....	.04	.05	.07	.08	.12	.15	.20	.30

46208. **Rubber Tubing, Extra Thick Wall**, same quality and color as No. 46200.

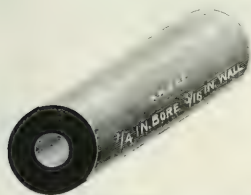
Inside diameter, mm.....	4	5	6	8
Thickness of wall, mm.....	3	3	3	3
Per foot.....	.15	.20	.25	.30

46212. Rubber Tubing, Thick Wall, of exactly the same quality as No. 46200, 46204 and 46208 but of pure red unvulcanized gum.

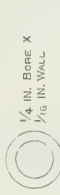
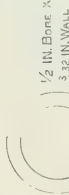
Inside diameter, mm.....	3	4	5	6	8	9	12	15	18	25
Thickness of wall, mm.....	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	1 $\frac{3}{4}$	2	2	3	3	3	4
Per foot in less than original lengths.....	.10	.12	.15	.27	.36	.42	.66	.85	.95	1.80
Per foot in 10 or 25 ft. lengths.....	.08	.10	.12	.23	.30	.35	.55	.70	.80	1.50

46216. Rubber Tubing, Thin Wall, same as No. 46212.

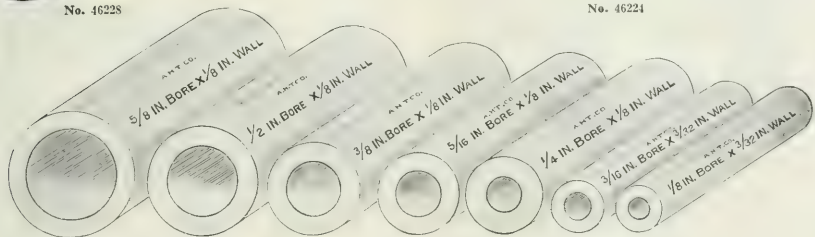
Inside diameter, mm.....	11 $\frac{1}{2}$	3	4	5	6	8	9	12
Thickness of wall, mm.....	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{3}{32}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2
Per foot in less than original lengths.....	.06	.06	.10	.12	.15	.18	.26	.38
Per foot in 10 or 25 ft. lengths.....	.05	.05	.08	.10	.13	.16	.22	.32



No. 46228



No. 46224



No. 46220

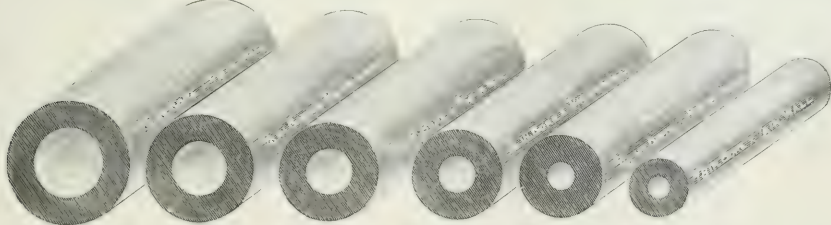
46220. Rubber Tubing, Thick Wall, Hand Made, Cloth Wrapped. This is an extra fine quality of flexible tubing, guaranteed not to split and of great endurance when exposed to laboratory fumes. It is not regularly to be had in the rubber trade and is made specially for us and bears our trademark at frequent intervals. The  $\frac{1}{4}$  x  $\frac{1}{8}$  inch is the standard size for Bunsen burner connections.

Inside diameter, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2	3	4	6
Thickness of wall, inches.....	$\frac{3}{32}$	$\frac{3}{32}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$
Per foot in less than original length.....	.06	.10	.12	.16	.20	.25	.30	.34	.50	
Per foot in original 12 ft. lengths.....	.04	.08	.10	.13	.15	.20	.24	.26	.40	

46224. Rubber Tubing, Thin Wall, Hand Made, Cloth Wrapped; same quality as above but with thinner wall. The  $\frac{1}{4}$  x  $\frac{1}{8}$  inch size is that mostly used for Bunsen burner connections.

Inside diameter, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2	3	4	6
Thickness of wall, inches.....	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$
Per foot in less than original lengths.....	.05	.07	.10	.12	.15	.20	.24	.26	.40	
Per foot in original 12 ft. lengths.....	.04	.05	.08	.10	.10	.16	.20	.20	.40	

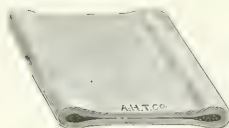
46228. Rubber Tubing, Pressure, Black, specially selected for use on Nitrometers. All our Nitrometers when ordered complete are fitted with this special tubing. Inside diameter  $\frac{1}{4}$  inch with  $\frac{1}{16}$  inch wall. Per foot..... .45



No. 46232

46232. Rubber Tubing, Pressure, of black semi-pure gum, very rigid to withstand heavy pressures. Recommended for use with filter pumps and similar connections.

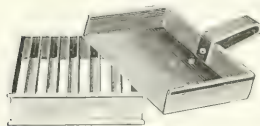
Inside diameter, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2	3	4	6
Thickness of wall, inches.....	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	1	1 $\frac{1}{2}$	2	3
Per foot.....	.20	.26	.36	.50	.85					



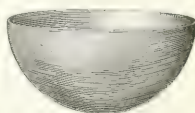
No. 46236



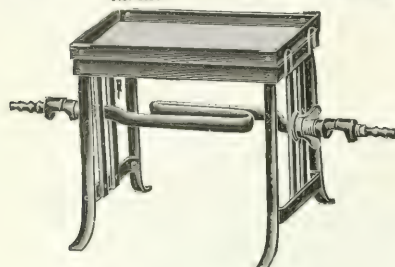
No. 46245



No. 46264



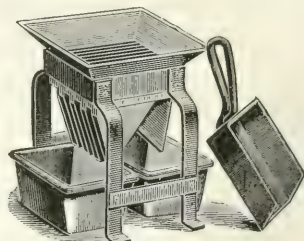
No. 46268



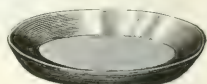
No. 46276



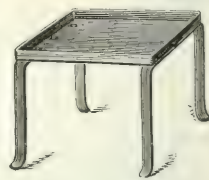
No. 46252



No. 46260



No. 46272



No. 46280

46236. Rubber Tubing, for Gooch Crucibles, so-called "band" tubing, very elastic. The inside diameter given is when measured in cylindrical shape, i. e., in position as used on crucible, and outside diameter is when measured flat.

Inside diameter, inches.....	$\frac{3}{4}$	1	$1\frac{1}{2}$	$1\frac{3}{4}$
Outside diameter, inches.....	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$

Per foot..... .20 .25 .30 .38

46240. Rubber Tubing, Composition, Machine Made. This tubing is very inferior to our hand made, cloth wrapped tubing but is in some demand in laboratories and we carry in stock one size suitable for burner connections, etc., other sizes are furnished on order at lowest market price. Inside diameter  $\frac{1}{4}$  inch by  $\frac{1}{8}$  inch wall. Per foot..... .05

46244. Rubber Tubing, Pressure, with canvas insertion moulded in the rubber; for very heavy vacuum connections.

Inside diameter, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Thickness of wall, inches.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$

Per foot..... .30 .40 .60 1.00

46248. Rubber Tubing Stretcher, for increasing bore of tubing for conveniently slipping over connection tubes, etc..... 1.00

46252. Rubber Viscosimeter, Frank, as used in the rubber industry and as adopted as standard by the International Rubber Testing Committee. See *Gummitzeitung* Nr. 27, 1911, and the *India Rubber Journal*, Vol. XLI, April, 1911. In wooden case, with thermometer, test solution and author's certificate of accuracy.

Duty Free..... 17.50 Duty Paid..... 25.00

46256. Rupert Drops, per ten..... .30

46260. Sampler, Jones, for convenient, rapid and uniform sampling of ores, cement, etc.; consisting of a hopper, scoop, 4 sampling pans and brush. All parts may be readily cleaned.

Size, inches.....	$4 \times 4$	$6 \times 6$	$8 \times 10$
Trays, inches.....	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$

Each..... 10.00 12.00 18.00

46264. Sampler, with Scoop, 6 inches square with divisions  $\frac{1}{2}$  inch wide..... 2.00

46268. Sand Baths, deep form, of sheet iron.

Diameter, inches.....	3	4	5	6	7	8	10
-----------------------	---	---	---	---	---	---	----

Each..... .10 .12 .15 .20 .30 .40 .80

46272. Sand Baths, shallow form, of sheet iron.

Diameter, inches.....	2	3	4	5	6	7	8	10
-----------------------	---	---	---	---	---	---	---	----

Each..... .08 .10 .12 .15 .18 .20 .30 .45

46276. Sand Baths, of wrought iron, with burner to heat entire surface; adjustable to height.

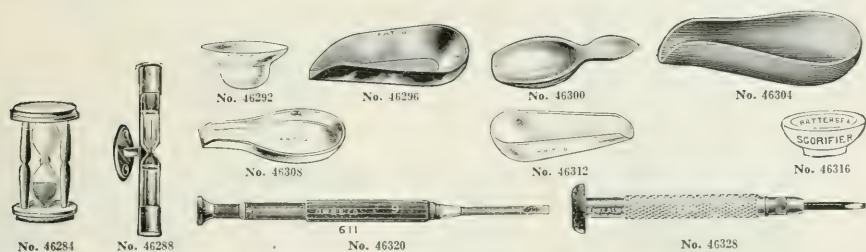
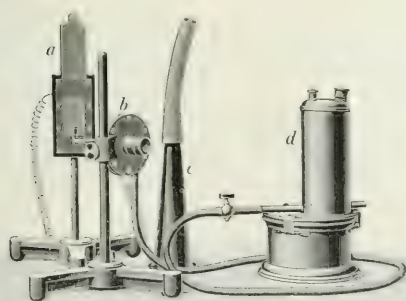
Size, cm.....	$25 \times 15$	$40 \times 20$	$60 \times 45$
---------------	----------------	----------------	----------------

Each..... 7.50 8.50 14.00

46280. Sand Baths, or Hot Plates, of iron, without burner.

Size, inches.....	$6 \times 8$	$8 \times 10$	$10 \times 12$
-------------------	--------------	---------------	----------------

Each..... 1.50 2.00 2.50

[illegible]

Nos. 46348, 46352, 46356

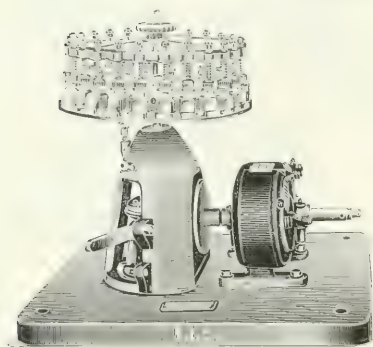


46344.	Selenium Cell, mounted, with 46 x 26 mm working surface, ebonite case, glass cover and brass slide for darkening the window. The selenium is spread over platinum iridium wire.	Duty Free	Duty Paid
		25.50	32.30
46348.	Selenium Cell, as above but unmounted. Fig. A of illustration.	15.00	19.00
46352.	Manometric Flame Apparatus with single flame acetylene burner and speaking tube, on stand. Figs. B and C of illustration.	6.90	8.75
46356.	Acetylene Generator, small. Fig. D of illustration.	6.00	7.60

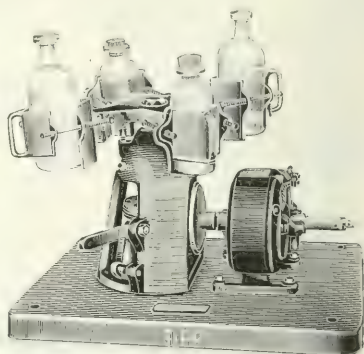


46360. **Selenium Cell**, of new construction and great sensibility. These cells are mounted air-tight so that it is unnecessary to enclose them in exhausted vessels. The light of a match will reduce the resistance which the cell has in the dark by from 10% to 20%. The diameters given are for the sensitive surface and the cells are supplied in ebonite mount with terminals.
- |                |       |       |       |
|----------------|-------|-------|-------|
| Diameter.....  | 45    | 60    | 75    |
| Duty Free..... | 9.25  | 11.90 | 14.60 |
| Duty Paid..... | 12.25 | 15.90 | 19.50 |
46364. **Electromagnetic Relay**, of high sensibility, with special contact, for use with above cells.
- |                |      |                |      |
|----------------|------|----------------|------|
| Duty Free..... | 7.20 | Duty Paid..... | 9.60 |
|----------------|------|----------------|------|

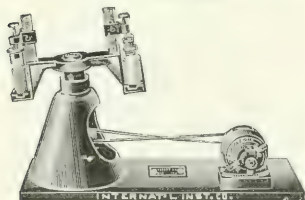
## SHAKING APPARATUS



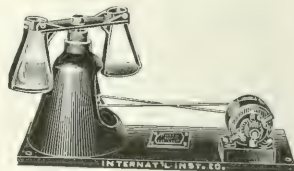
No. 46380



No. 46381

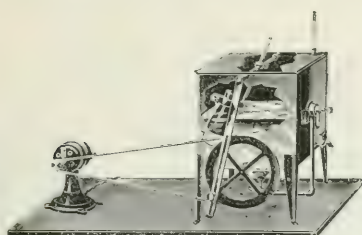


No. 46392 with 2-50 cc Bottle Head

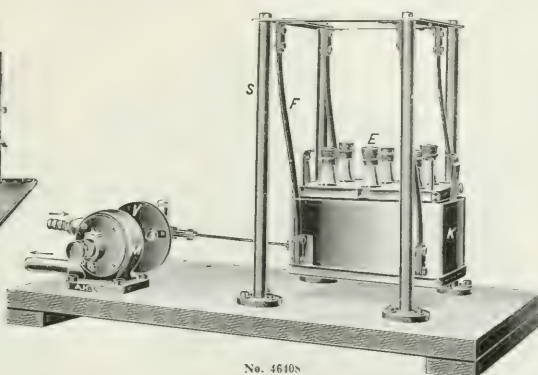


No. 46392 with 46396 Erlenmeyer Flask Head

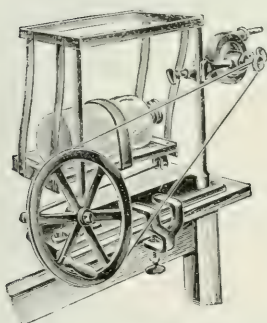
46380. **Shaking Apparatus for Sputum, Rickards.** This machine is widely and satisfactorily used in many large laboratories where routine sputum work is done on a large scale. The new model is a distinct improvement, is directly driven with adjustment for varying the speed. The sputum is shaken in the original bottles in which it is collected. Furnished with electric motor only.
- |                  |                  |                  |                  |                  |
|------------------|------------------|------------------|------------------|------------------|
| For current..... | 110 volts, d. c. | 220 volts, d. c. | 110 volts, a. c. | 220 volts, a. c. |
|                  | 60 cycles        | 60 cycles        | 60 cycles        | 60 cycles        |
| Each.....        | 90.00            | 93.00            | 97.00            | 99.00            |
46381. **Head, only**, for above Shaking Apparatus, carrying 4 bottles of from 125 to 1000 cc capacity 40.00
46384. **Shaking Apparatus**, exactly same as above, but with 4-bottle head taking 1 bottles of any size from 125 to 1000 cc capacity. Speed may be varied from 100 to 1000 revolutions per minute, according to the load. A practical and satisfactory apparatus for the preparation of vaccines, etc.
- |              |                  |                  |                  |                  |
|--------------|------------------|------------------|------------------|------------------|
| Current..... | 110 volts, d. c. | 220 volts, d. c. | 110 volts, a. c. | 220 volts, a. c. |
|              | 60 cycles        | 60 cycles        | 60 cycles        | 60 cycles        |
| Each.....    | 90.00            | 93.00            | 97.00            | 99.00            |
46385. **Head, only**, for above Shaking Apparatus, carrying 24 bottles..... 40.00
46392. **Shaking Apparatus in Combination with Low Speed Centrifuge.** As a shaking device this apparatus is furnished with two heads, one size taking 2-50 cc bottles or two test tubes up to 5 inches in length and with which a maximum speed of 1000 r. p. m. is obtained. The larger head takes 2-500 cc bottles at a maximum speed of 300 r. p. m. These heads may be used interchangeably with the 2-Erlenmeyer Flask head. Price is the same for the Shaker with either the 2-50 cc bottle or 2-500 cc bottle head, but does not include the 2-Erlenmeyer flask centrifuge head.
- |              |                  |                  |                  |                  |
|--------------|------------------|------------------|------------------|------------------|
| Current..... | 110 volts, d. c. | 220 volts, d. c. | 110 volts, a. c. | 220 volts, a. c. |
|              | 60 cycles        | 60 cycles        | 60 cycles        | 60 cycles        |
| Each.....    | 55.00            | 59.00            | 65.00            | 67.00            |
46396. **Head, only**, 2-Erlenmeyer Flask Centrifuge Head, for attachment to above Shaker..... 10.00
46400. **Head, only**, 2-bottle Shaker Head. This head may also be attached to No. 24064 Centrifuge 20.00
46401. **Head, only**, 4-bottle Shaker Head. This head may also be attached to No. 24184 Centrifuge 22.00



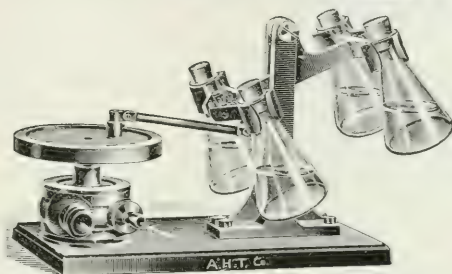
No. 46401



No. 46408

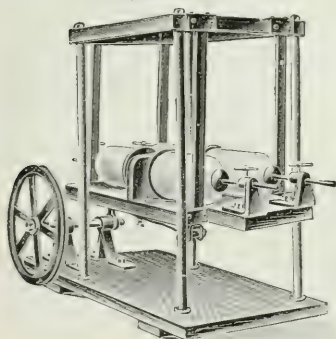


No. 46412



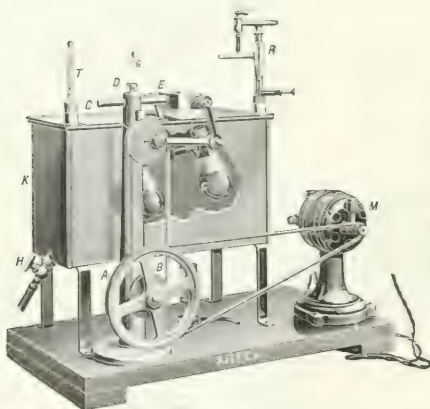
No. 46416

46401. **Shaking Apparatus, Hearson, with Water Bath.** For maintaining a constant temperature between 30° and 90° C. Price includes thermometer, burner, capsule and motor for 110 volts direct current. As the range of each capsule is about 15° C., temperature at which the bath is to be used should be stated in ordering.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 56.70 | Duty Paid..... | 85.05 |
|----------------|-------|----------------|-------|
46408. **Shaking Apparatus, Frankfurt model, latest noiseless construction, carrying one 1 liter flask or 6 smaller Erlenmeyer flasks.** With water motor, as shown in illustration.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 56.10 | Duty Paid..... | 67.35 |
|----------------|-------|----------------|-------|
46412. **Shaking Apparatus, as above.** With electric motor. Voltage must be stated in ordering.
- |                |       |                |       |
|----------------|-------|----------------|-------|
| Duty Free..... | 69.30 | Duty Paid..... | 83.20 |
|----------------|-------|----------------|-------|
46416. **Shaking Apparatus, taking either four small Erlenmeyer Flasks or four large test tubes.** A simple and convenient form of shaking apparatus of great efficiency. With water motor but without glassware.....
- |  |  |  |       |
|--|--|--|-------|
|  |  |  | 15.00 |
|--|--|--|-------|

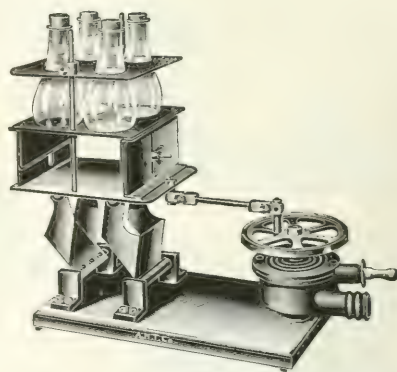


No. 46440

- |        |  |           |           |
|--------|--|-----------|-----------|
| 46420. | <b>Shaking Apparatus, for one 1 liter bottle. With water turbine as shown in illustration.</b>   | Duty Free | Duty Paid |
|        |  | 13.20     | 16.00     |
| 46424. | <b>Shaking Apparatus, as above, for two 1 liter bottles.....</b>   | 16.50     | 20.00     |
| 46428. | <b>Shaking Apparatus, as above, for one 1 liter bottle, without turbine, for either hand or power driving.....</b>                     | 10.00     | 12.50     |
| 46432. | <b>Shaking Apparatus, same as above but for two 1 liter bottles.....</b>   | 13.20     | 16.00     |
| 46436. | <b>Shaking Apparatus, for large bottles, operating on the same principle as above, for two 5 liter bottles, for power driving.....</b> | 24.75     | 30.00     |
| 46440. | <b>Shaking Apparatus, as above, for four 5 liter bottles.....</b>  | 29.70     | 36.00     |



No. 46444



No. 46448

46444. Shaking Apparatus (Kinotherm), Uhlenhuth, for shaking in constant temperature. Without burner, thermometer, or thermo-regulator. See P. Uhlenhuth und A. Weidanz; *Prakt Anleitung zur Ausführung des biologischen Eiweissdifferenzierungsverfahrens*, S 150, Jena 1909.
- | Motor.....     | Water | Alternating Current | Direct Current |
|----------------|-------|---------------------|----------------|
| Duty Free..... | 28.05 | 49.50               | 44.55          |
| Duty Paid..... | 33.70 | 59.40               | 53.50          |
- 46448 Shaking Apparatus, Poppe, for the preparation of organic extracts, emulsions, etc.; taking four Erlenmeyer flasks. With water motor.....20.00



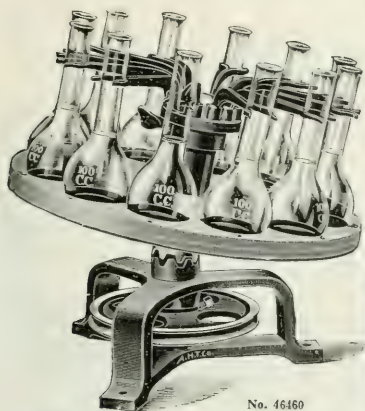
No. 46452



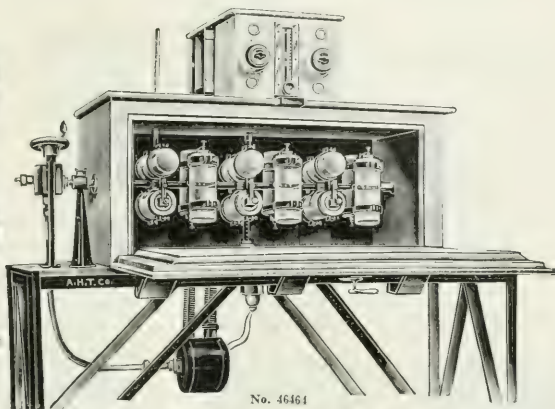
No. 46456

46452. Shaking Apparatus, New Model, with electric driving, of robust and rigid construction for continuous operation; with eccentricity of the stroke readily changeable. Motor is furnished for both alternating and direct currents, 110 and 220 volts. Voltage must be stated in ordering
- | Duty Free..... | Duty Paid..... |
|----------------|----------------|
| 48.00          | 57.60          |
46456. Shaking Apparatus, Camp, (Patented) particularly suited for the rapid precipitation of phosphorus by the molybdaic method, and dissolving steels or pig-iron for carbon combustion. Made to hold 6 flasks from 6 to 24 ounces, either Florence or Erlenmeyer shape; pulley 6 inches in diameter; power required about  $\frac{1}{2}$  H. P. Can be operated by small electric motor with suitable counter-shaft to control speed, or by direct connection to a water motor..... 27.50





No. 46460



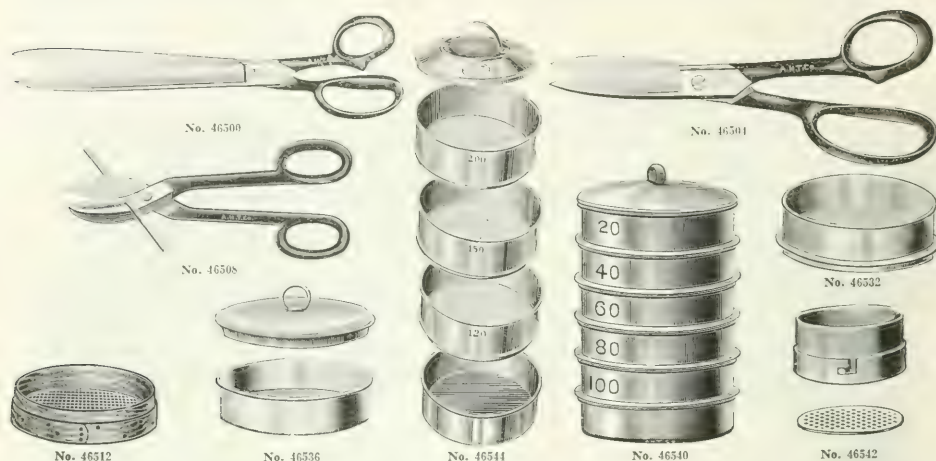
No. 46461

46460. Shaking Apparatus, Camp, as above but with wooden disc and clamps to accommodate 12 volumetric flasks 100 cc, for sugar analysis, etc. .... 35.00
46461. Shaking Apparatus, Freas Electric, specially designed for shaking soil samples at constant temperature; it can, however, be successfully employed for other purposes requiring constant temperature below 175° C. Consisting of a rectangular oven built of asbestos wood, inside dimensions 14 inches high, 14 inches deep, 30 inches wide; equipped with a shaft to which is fitted six double adjustable clamps, easily removable for holding 12 wide mouth bottles, 12 ounce capacity. The shaft is rotated by means of an electric motor fitted as shown in the illustration. The shaft can easily be removed to permit of the chamber being used as an oven. The heating is accomplished by a flat resistance wire wound heating plate, while the devices for maintaining constant temperature and quickly setting for any desired temperature are identical with those employed in the Freas' Electric Ovens. Mounted on heavy iron stand as shown in illustration, complete with motor and 12 glass stoppered bottles, 350 cc capacity. .... 175.00



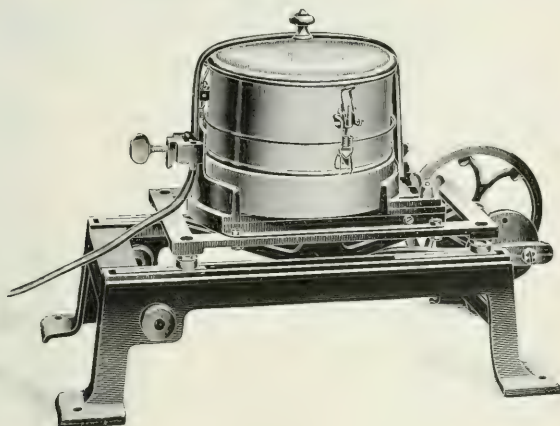
View in Showroom Showing Incubators, Balances, Etc.



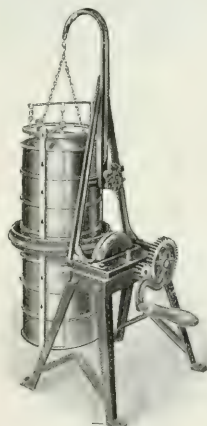


46500.	Shears, for cloth, with nicked blades and japanned handles.								
	Total length, inches.....	6	8	10	12				
	Length of cutting edge, inches.....	2½	3½	5	6				
	Each.....	.50	.75	1.00	1.25				
46504.	Shears, strong and heavy, with short blades, for general laboratory use; total length 8½ inches, length of cutting edge, 2½ inches				1.00				
46508.	Shears, Tinner's, for cutting metal and wire. Total length, inches.....	8½	11½	12½	12½				
	Length of cutting edge, inches.....	2	2½	3	3				
	Each.....	1.50	2.00	2.25	2.25				
	Sieves, Brass Gauze, with Wooden Frame.								
	Mesh.....	10	20	40	60	80	100		
46512.	Each, 6 inches diameter.....	.35	.40	.45	.50	.85	1.10		
46516.	Each, 8 inches diameter.....	.45	.45	.60	.90	1.10	1.40		
46520.	Each, 10 inches diameter.....	.60	.60	.70	.90	1.35	1.75		
46524.	Each, 12 inches diameter.....	.70	.70	.80	1.10	1.50	2.00		
	Sieves, Brass Gauze with Brass Frame, without cover or receiver.								
	Mesh.....	10	20	40	60	80	100	200	
46528.	Each, 5 inches diameter.....	1.00	1.00	1.10	1.20	1.30	1.40	4.25	
46532.	Each, 8 inches diameter.....	1.50	1.50	1.60	1.70	1.80	2.60	7.00	
46536.	Cover and Receiver, for above sieves. For, diameter, inches.....						5	8	
	Each.....						1.00	1.10	
46540.	Sieves, Brass, in nest of five, 20, 40, 60, 80 and 100 mesh, with cover and receiver.						5	8	
	Diameter, inches.....						6.00	9.00	
	Per nest.....								
46542.	Sieve, Brass, with four removable brass plates with circular openings of ½, ¾, 1 and 2 mm diameter, respectively. The plates may be quickly attached and detached; 90 mm diameter.....							5.00	
46544.	Sieves, Standard Testing, with seamless brass frame, according to the specifications of the American Society of Civil Engineers. These sieves are distinctly superior to those made of ordinarily woven brass cloth as the screen is absolutely square in mesh and made from the same gauge wire both ways; 8 inches in diameter.								
	Mesh.....	20	30	35	40	45	50	60	70
	Opening, inches.....	.0340	.0198	.0176	.0150	.0127	.0110	.0087	.0073
	" mm.....	.864	.503	.447	.381	.323	.279	.221	.185
	Diameter of wire, inches.....	.016	.0135	.011	.010	.0095	.009	.008	.007
	Each.....	3.00	3.00	3.00	3.00	3.25	3.25	3.25	3.40
	Mesh.....	80	90	100	110	120	130	140	150
	Opening, inches.....	.0068	.0059	.0055	.0051	.0046	.0043	.0042	.0041
	" mm.....	.173	.150	.140	.130	.117	.109	.107	.104
	Diameter of wire, inches.....	.00575	.00525	.0045	.004	.0037	.0034	.0029	.0026
	Each.....	3.70	4.00	4.30	4.45	4.60	4.95	5.20	5.50
	Mesh.....	160	170	180	190	200	220	240	300
	Opening, inches.....	.0038	.0035	.0033	.0031	.0029	.0028	.0026	.0017
	" mm.....	.096	.089	.084	.079	.074	.071	.066	.043
	Diameter of wire, inches.....	.0025	.0024	.0023	.0022	.0021	.0017	.0016	.0016
	Each.....	5.80	6.40	7.00	7.35	7.60	8.20	9.40	14.20
46546.	Cover and Receiver for above, per set of one each.....								2.50

46552. Sieves, Standard Testing, as above, but in a telescoping nest of 8 sieves, varying in diameter from 5 to 8½ inches and consisting of one each of 10, 20, 30, 40, 50, 80, 100 and 200 mesh. Per set. 15.00
46556. Sieve, Cement, Bureau of Standards, of brass, 20 cm in diameter and 6 cm high, with standard woven brass screen. The 100 mesh sieve has .0055-inch openings and the 200 mesh has .0029-inch openings.
- |   |      |       |
|---|------|-------|
| Mesh.....                                       | 100  | 200   |
| Each, with Bureau of Standards certificate..... | 6.00 | 12.00 |
46560. Sieve, Sand, Bureau of Standards, of brass, 20 cm in diameter and 6 cm high.
- |   |        |        |
|---|--------|--------|
| Mesh.....                                       | 20     | 30     |
| Openings, inches.....                           | 0.0335 | 0.0223 |
| Each, with Bureau of Standards certificate..... | 6.00   | 6.00   |
46564. Sieve, Brass, with circular openings in bottom as used in soil and fertilizer work; with seamless brass frame; 5 inches in diameter; of same construction as No. 46528 and 46532.
- |                           |      |      |      |      |      |
|---------------------------|------|------|------|------|------|
| Size of openings, mm..... | ½    | 1    | 2    | 3    | 5    |
| Each.....                 | 1.50 | 1.50 | 1.25 | 1.25 | 1.25 |
46568. Sieves, Brass, in set of 5 as above, with circular openings ½, 1, 2, 3 and 5 mm; 5 inches in diameter, with cover and receiver. Per set. 7.75

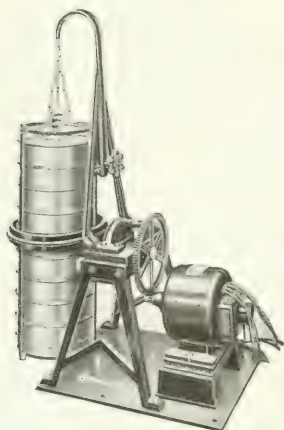


No. 46572

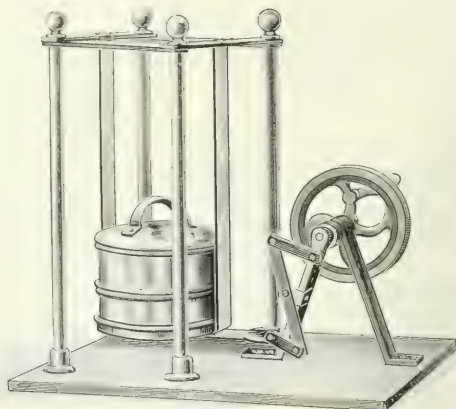


No. 46576

46572. Sieve Shaking Machine, for motor driving. The horizontal motion takes place on ball bearings operating in oil and the machine is noiseless in operation. With an enamelled sieve of 200 mm diameter with 6 inserts same diameter. Other sieves of same diameter in varying numbers may be used on this machine, being conveniently held in place by the strap over the top as shown in illustration. 25.00
46576. Sieve Shaker, Braun, for 8 inch standard sieves. This apparatus will be found a great time and labor saver in grading samples of sand, cement, ores and other materials. In repeated tests, using the same sample, identical results are obtained, which guarantees the reliability of this machine. From one to eight sieves of 8 inch diameter can be placed in the machine at one time. These sieves are mounted in a brass frame supported by a chain. The supporting arch is adjustable so that when a small number of sieves are placed in the hanger it can be raised to the proper height, thus allowing the surrounding frame to strike the sieves. A special hanger allows the sieves to rotate slowly while being shaken. This rotation is caused by the peculiar shape of the surrounding frame which strikes the sieve on all sides, securing a complete separation of the various mesh products. The interior of the surrounding frame is lined with leather, which protects the sieves. It is very light running and requires little effort to operate. In a test run, using a 10 gram sample of sand, it requires 7 minutes to obtain an accurate separation using 8 sieves from 10 to 200 mesh. For hand operation, without sieves. 50.00
46580. Sieve Shaker, as above, but with electric motor drive, for either alternating current of 110 volts, 60 cycles, or direct current of 110 volts. Current must be specified in ordering. Without sieves. 90.00



No. 46580



No. 46584

46584. Sieve Shaking Apparatus, for use with either hand or power, on wooden base 11 x 20 inches, height over all 17 inches. Will take conveniently from one to four sieves up to 6 inches in diameter. 30.00



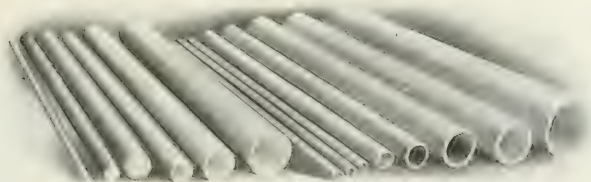
No. 46588



No. 46592

46588. Sieve Shaker, Per Se, taking standard 8 inch sieves, for power or hand driving; as used in sieving rice, drugs, emery, corundum, fire clay, litharge, silica, sulphur, cement, phosphates, pigments, sugar, gunpowder, guano, whiting, salt, starch, flour, linseed, cottonseed, boneblack, etc. The mechanical motion secured in these shakers is an eccentric, semi-rotary motion with a vertical drop. The sharp vertical drop or jog has been found very necessary in order to free the meshes from those particles which would ordinarily remain in the apertures of the cloth and to which in a great measure the efficiency of the device may be ascribed. These movements simulate very closely those obtained in hand manipulation of individual screens and the results secured show very close agreement between hand and the mechanical method. The machines are mounted on solid base with firm clamping device for the sieves. Without sieves..... 90.00

46592. Sieve Shaker, Per Se, as above but with directly connected direct current electric motor. Without sieves..... 150.00



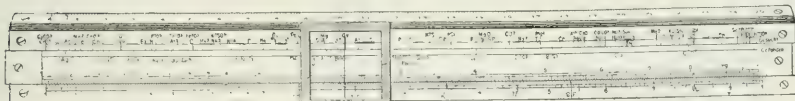
No. 46604

46600. **Silica Rod, Opaque Fused Silica**, useful for stirring and pouring at high temperatures, particularly in the case of high melting metals and alloys which do not form basic oxides, also for the construction of delicate physical apparatus where material is required with extremely small coefficient of expansion. Furnished in lengths up to 6 ft.

Diameter, mm.....	1-2	3	4-5	6-7	8	9-10
Per foot.....	.40	.50	.75	1.00	1.25	1.40

46604. **Silica Tubing, Opaque Fused Silica**, The unglazed tubes, while rough on the outside, are glazed as the ends and comparatively smooth on the inside. The glazed tubes are highly glazed on the outside and at the ends, presenting a distinctive homogeneous structure throughout. The unglazed tubing up to 9 mm bore is finished in so-called Satin finish. Furnished in all of the sizes listed in lengths up to 8 ft. but when lengths less than 1 ft. are ordered an advance of 10% is made in price. Larger diameters are furnished at special price.

Bore, mm.....	1-2	3	4-5	6-7	8	9-10	11	12-13	14	15-16	17-18
Thickness of wall, mm.....	.5-3	.5-2.5	.5-2	.5-2	.5-2	1-2	1-2	1-2	1-2.5	1-2.5	1-2.5
Unglazed, per foot.....	.25	.45	.75	.90	1.10	1.25	1.40	1.50	1.60	1.75	1.90
Glazed, per foot.....								1.75	2.10	2.25	2.40
Extra, closed at one end.....	.10	.15	.20	.20	.20	.25	.25	.25	.35	.35	.50
Bore, mm.....	19	22	25	28-30	31-32	35	38	41	44	48	51
Thickness of wall, mm.....	1-3	1-3	1-3	2-4	2-4	2-5	2-5	2-5	2-5	2-5	2-5
Unglazed, per foot.....	2.10	2.30	2.50	2.75	2.90	3.00	3.20	3.35	3.50	3.75	3.90
Glazed, per foot.....	2.60	2.80	3.25	3.50	3.65	4.00	4.20	4.50	4.75	5.10	5.30
Extra, closed at one end.....	.50	.65	.75	.75	.75	.90	.90	.90	1.00	1.09	1.00

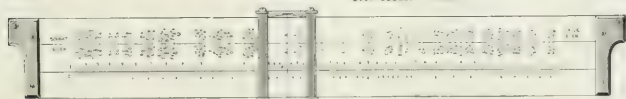


No. 46608.

46608. **Slide Rule, Nestler**, for chemical calculations; of mahogany, with scale on white celluloid; providing for all calculations as met with in chemical practice. Complete in case with instructions for use..... 4.50



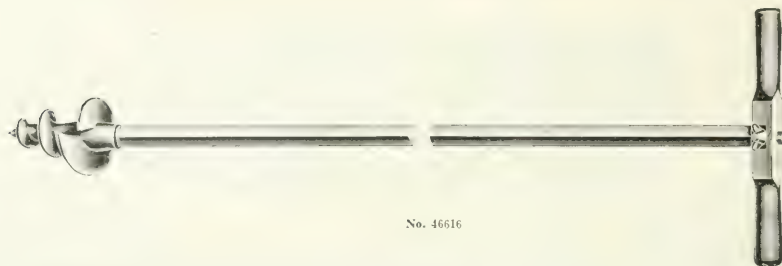
No. 46612. Front



No. 46612. Back

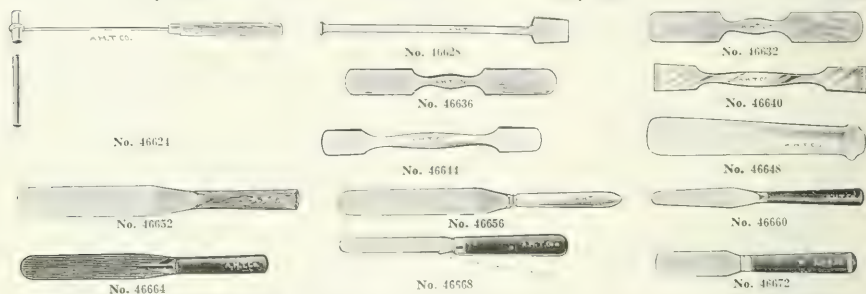
46612. **Slide Rule, Duplex**, designed to adapt the logarithmic and cologarithmic scales to the rapid solution of the problems encountered by the chemist. The symbols on the rule, being arranged in the order of their molecular weight, are easily found, while the application of a very simple rule enables the chemist to locate other symbols of less frequent occurrence. The rule carries 138 chemical symbols which include the common acids, bases, salts, oxides, and elements. As each symbol has its individual position corresponding to the logarithm of its molecular weight, the number of permutations and combinations possible covers the requirements of almost any problem. By using the logarithmic and cologarithmic scales in conjunction with the chemical gauge points, problems in Stoichiometry, such as gravimetric analysis, volumetric analysis, equivalents, percentage composition, conversion factors, volume of gas from a given weight of substance at different temperatures and pressures, and many other analogous problems are readily solved. The rule is accompanied by a manual giving the theory of its use together with numerous examples of both an arithmetical and chemical nature. Length 10 inches, engine divided, divisions on white facings, glass indicator, in morocco covered case, with directions..... 8.00





No. 46616

46616. Soil Borer, American type, regularly furnished with shaft 1 meter long but can be supplied in any length desired by means of extension pieces 1 meter in length.  
Diameter of cutter, mm. . . . . 50 80 105 130 150  
Duty Free . . . . . 3.45 3.80 4.15 5.15 5.75  
Duty Paid . . . . . 4.60 5.00 5.50 6.85 7.70  
46620. Extra Extension Pieces, 1 meter long.  
Duty Free . . . . . 1.15 Duty Paid . . . . . 1.50



46621. Sodium Spoon, with ramrod and tube mounted on handle. . . . . .25  
46628. Spatula, Glass, 6 inches long, with flat ground blade  $\frac{1}{8}$  inch wide. . . . . .20  
46632. "Horn, double, with spatula on each end.  
Length, mm. . . . . 100 120 150 100 240 280 300  
Each. . . . . .10 .12 .15 .25 .40 .60 .90  
46636. Spatula, Bone, double, with spatula at each end. . . . . 150 200  
Each. . . . . .20 .30  
46640. Spatula, Solid Nickel, double, with spatula on each end, and not flexible.  
Length, mm. . . . . 120 150 180 210  
Each. . . . . .50 .70 .80 1.25  
46644. Spatula, Porcelain, double, with spatula on each end.  
Length, mm. . . . . 105 130 160 185 235 260  
Each. . . . . .28 .28 .40 .40 .60 .80  
46648. Spatula, Porcelain, single, i.e. with knob on one end and blade on other.  
Length, mm. . . . . 235 290 340  
Each. . . . . .55 .70 .90  
46652. Spatula, Steel, very flexible, with cocoa wood handle.  
Length of blade, inches. . . . . 3 4 5 6 7 8 10 12  
Each. . . . . .25 .26 .30 .40 .50 .60 1.00 1.70  
46656. Spatula, Steel, with nickel plated steel handle  
Length of blade, inches. . . . . 3 4 5 6 8  
Each. . . . . .45 .50 .60 .65 .90  
46660. Spatula, Steel, with very flexible narrow blade and blackwood handle. Very convenient for weighing.  
Length of blade, inches. . . . . 3 4 5 6  
Each. . . . . .35 .40 .50 .60  
46664. Spatula, Hard Rubber throughout, with very thin flexible blade.  
Length, inches. . . . . 4 6 8  
Each. . . . . .45 .55 .80  
46668. Spatula, folding form, i.e. like pocket knife; with thin flexible steel blade  $\frac{1}{8}$  inch wide and 3 inches long, in ebony handle; very convenient for carrying in the pocket. . . . . .75  
46672. Spatula, short form, with wide blade, so-called "Pill Knife," of steel with ebony handle.  
Length of blade, inches. . . . . 2 3 4  
Each. . . . . .40 .50

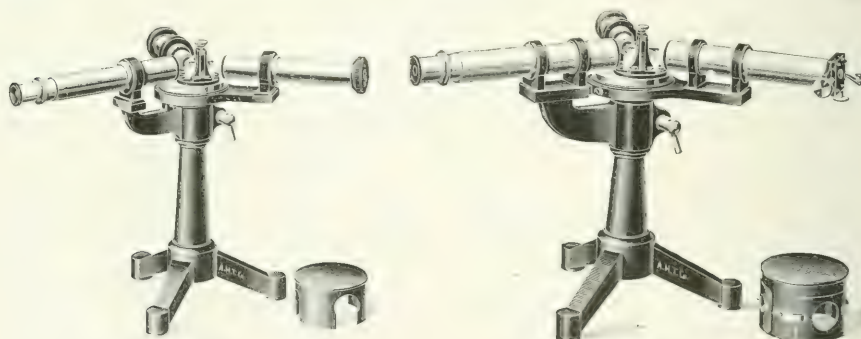




23844. Specific Gravity Bottle, Le Chatelier, as used in cement testing..... 2.00  
 23848. Specific Gravity Bottle, Le Chatelier, new form, in accordance with the U. S. Bureau of Standards requirements and as used in the U. S. Government test for Portland Cement. See Circular No. 33 of the U. S. Bureau of Standards, without certificate..... 3.00  
 23852. Specific Gravity Bottle, Le Chatelier, an above but with the certificate of the U. S. Bureau of Standards..... 5.00  
 23856. Specific Gravity Bottle, Schuman, with tube graduated to 50 cc in 1 lbs..... 2.50  
 46744. " " Thörner, for solids, particularly coke and charcoal; also used for the determination of porosity; graduated from 0 to 100 cc in 1 lbs. Price includes cylinder..... 3.60  
 46748. Specific Gravity Bottle, Hubbard, designed especially for bitumens, heavy oils, etc., with solid stopper ground in, with an opening of 1.6 mm diameter instead of usual capillary. Capacity 24 cc. 1.00  
 23840. Specific Gravity Apparatus, Jackson, for the true determination of the specific gravity of cement. Consists of a special burette with bulb and stopcock and a special flask with ground in funnel stopper of exactly the same bore as the burette. As described in the Journal of the Society of Chemical Industry 15 June, 1904. No. 11, Vol. XXIII..... 6.00  
 23841. Extra Flask, only, for use with above..... 2.00

## SPECTROSCOPES, SPECTROGRAPHS, SPECTROPHOTOMETERS AND ACCESSORIES

46800. Spectroscope, Direct Vision, pocket form, 90 mm long, with adjustable slit In case..... 10.00  
 46804. " " " " " same as above but with comparison prism and illuminating mirror..... 14.50



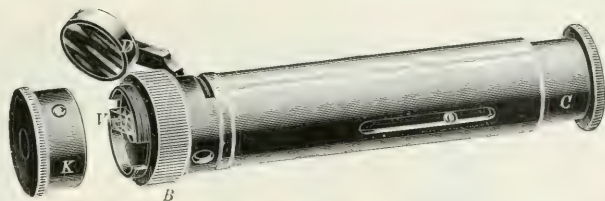
No. 46808

No. 46812

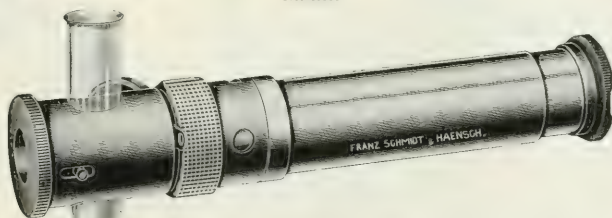
46808. Spectroscope, with adjustable telescope, adjustable slit and metal cover for the prism, with objective 15 mm diameter.  
 Duty Free..... 25.20 Stock..... 35.00  
 46812. Spectroscope, with cylindrical cover for the prism (illustration shows same removed) with telescope, 20 mm objective and scale tube. Slit adjustable by micrometer screw. With comparison prism.  
 Duty Free..... 45.00 Stock..... 60.00



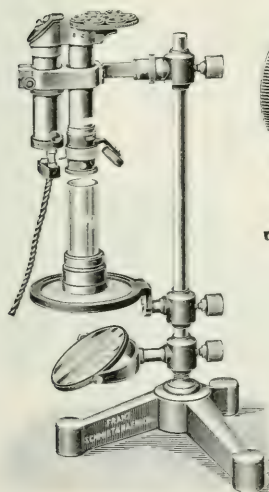
No. 46820



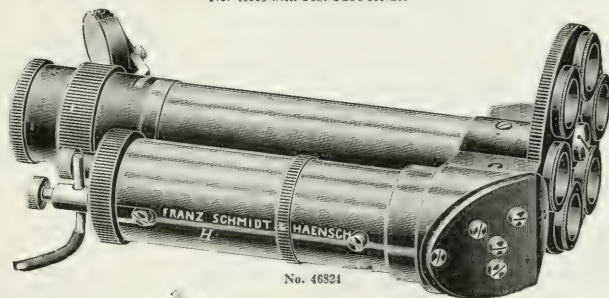
No. 46816



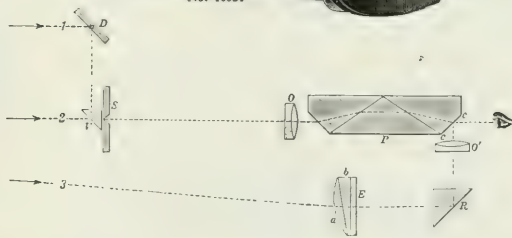
No. 46816 with Test Tube Holder



No. 46832



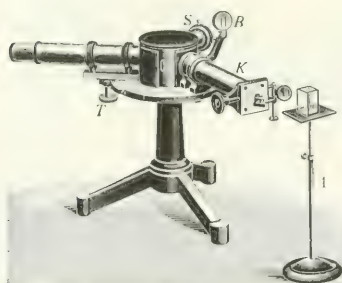
No. 46824



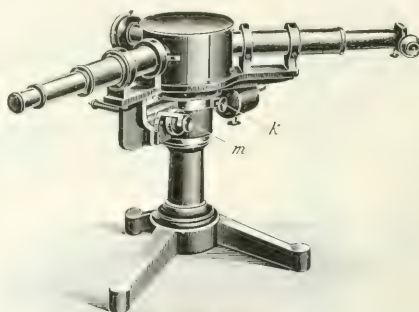
Optical Plan of No. 46824

46816. Spectroscope, Vogel, Direct Vision, Schmidt & Haensch, total length 170 mm. With comparison prism, illuminating mirror, holder for small test tubes and six extra test tubes. In case.  
Duty Free..... 13.65 Stock..... 18.20
46820. Stand for Direct Vision Spectroscopes, especially No. 46816, with absorption trough..... 6.00
46824. Spectroscope, Martens, Direct Vision, Schmidt & Haensch, with comparison prism and wave length scale. A rotating disc with lenses of different foci after Martens permits the accurate adjustment of the telescope for any eye. The diagram above illustrates the operation of this spectroscope when used without illuminating device which is only necessary with very weak spectra and which may be operated by three cells of dry battery. In case.  
Duty Free..... 28.20 Duty Paid..... 37.60
46828. Spectroscope, same as above but with the addition of Beckmann electric lighting arrangement with special cap for comparison prism, without accumulator.  
Duty Free..... 41.70 Duty Paid..... 55.60
46832. Stand for Direct Vision Spectroscopes, particularly designed for Martens Wave Length Spectroscopes No. 46824 consisting of support, mirror glass, stage, clamp for spectroscope, absorption trough and absorption tube, with polished wooden case taking both spectroscope and support.  
Duty Free..... 21.45 Duty Paid..... 28.60



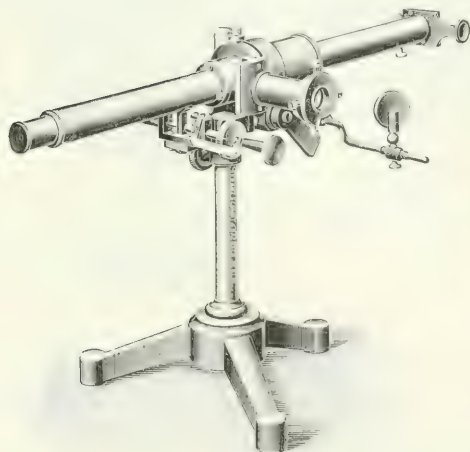


No. 46836

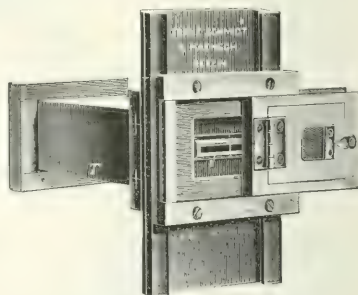


No. 46840

46836. Spectroscope, Kirchhoff-Bunsen, Schmidt & Haensch, Model II, with enclosed prism case, rack and pinion adjustment for the telescope, 15 mm objective, flint prism of dispersion  $C - F = 1^{\circ} 56'$  in mounting, unsymmetrical slit with micrometer head reading to  $\frac{1}{100}$  mm, Ramsden ocular 28 mm focus, photographic scale with orienting device "S," wavelength scale, mirror for illuminating scale, mirror for illuminating slit, adjustable table support and glass cell as shown in illustration. Duty Free 73.95 Stock 98.65
46840. Spectroscope, Kirchhoff-Bunsen, Schmidt & Haensch Model III, with unsymmetrical slit and 24 mm objectives. The micrometer adjustment is furnished with a dispersion curve giving the wave length for different readings. With two Ramsden oculars of 28 and 11 mm focus, with cross hairs; with flint glass prism of Jena glass No. 0.102  $N_D = 1.649$ , dispersion  $C - F = 1^{\circ} 65'$ , face 28 x 31 mm; photographic scale and mirror for illuminating slit. This instrument may be used for a great variety of work in connection with studies in both emissions and absorption spectra, spectrophotometry, etc., and with the camera listed below. Duty Free 121.05 Duty Paid 161.50

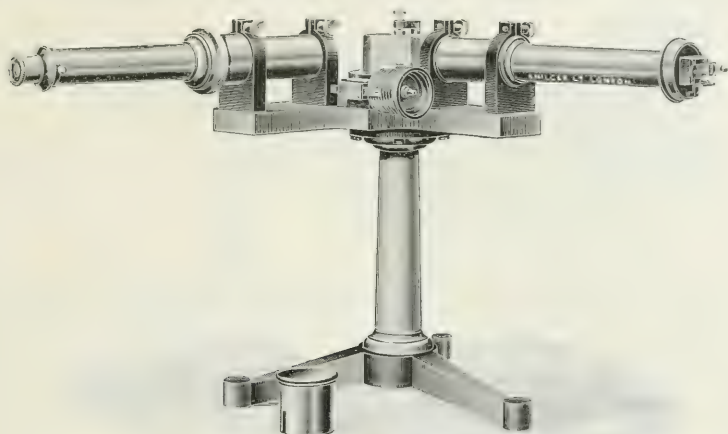


No. 46844



No. 46856

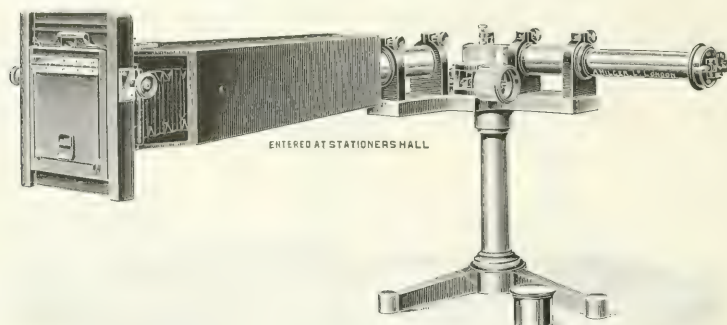
46844. Spectroscope, Hoffman, Direct Vision, Schmidt & Haensch, large model, with micrometer adjustment for telescope tube permitting same to move over the entire spectrum, with direct vision prism of dispersion  $C - F = 5^{\circ} 30'$ , telescope objective of 200 mm focus, adjustable slit with comparison prism, one ocular of 28 mm focus, with cross hairs, illuminated by prism inside, and one ocular of 11 mm focus with pointer scale, telescope with rotating scale and mirror for illumination of same. Suitable for general chemical analyses, wavelength determinations and for the securing of light of a given wavelength for other optical purposes as in spectrophotometry, etc. Duty Free 119.75 Duty Paid 160.00
46848. Rutherford Prism, with mounting, dispersion  $C - F = 3^{\circ} 26'$ . For use with Nos. 46840 and 46844. Duty Free 15.00 Duty Paid 20.00
46852. Wavelength Scale for use with Rutherford prism. For use with Nos. 46840 and 46844. Duty Free 9.60 Duty Paid 12.80
46856. Photographic Camera for 6 x 9 cm plates, with achromatic objective of 260 mm, camera tube and plate holder for photography of visible spectra only but can be adapted with quartz lens, uranium glass plate, etc., at an extra charge, for the ultra violet. For use with Nos. 46840 and 46844. Duty Free 86.25 Duty Paid 115.00



No. 46860

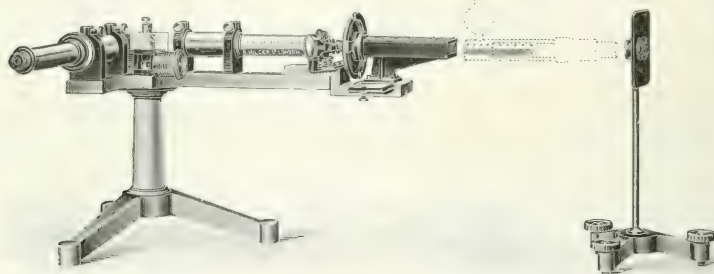
46860.	<b>Wavelength Spectrometer, Hilger Constant Deviation Type.</b> This instrument, since first introduced in 1904, has been found useful for a great variety of purposes. The outfits here listed are those recommended for general spectrum analysis, spectrophotometry, (in combination with Nutting photometer) and quantitative estimation of colored salts, dyes and organic substances possessing suitable absorption bands when in solution. Accessories for the infra-red and spectrum observations of Zeeman effect are also supplied on special order and are fully described in the Hilger catalogue which will be sent upon application. The prism is of the "constant deviation" type. The telescope and collimator are both rigidly fixed, since to pass through the spectrum it is only necessary to rotate the prism; and as a result a construction is arrived at which is at once extremely convenient and mechanically sound. The table on which the prism stands is rotated by means of a fine steel screw, the point of which pushes against a projecting arm on the prism table. To the screw is fixed a drum on which the wavelengths of the line under observation are read off direct as indicated by the index which runs in a helical slot. In the most recent instruments this index is on the side of the drum towards the eye; so that the wavelengths of lines can be read off without quitting the eyepiece. The point of the micrometer screw is of hardened steel, and is permanently fixed before the screw thread is cut, to avoid the risk of periodic errors, the point forming one of the centers while the screw thread is being cut. This hardened steel point presses against a steel plug in the above mentioned projecting arm of the prism table, itself flint-hard and optically polished. The telescope and collimator are both rigidly fixed to the cast-iron base, and the whole is screwed to a strong cast-iron tripod. The object glasses of both telescope and collimator are of 11½ inches (285 mm) focal length, and 1½ inches (31½ mm) clear aperture. The focussing of the telescope is obtained by the milled ring, which can be seen in the figure on the body of the telescope. By the turning of this ring the object glass is made to move by a carefully protected helical mechanism, the eyepiece remaining always fixed. By this means a more accurate focussing adjustment is obtained, without the liability to a sideways shift of the lines due to the focussing, which it is impossible to entirely avoid in the older form. With prism of 1.65 refractive index for D, accurately calibrated from 385μ to 800μ.....	Duty Free 135.00	Duty Paid 185.00
46864.	<b>Wavelength Spectrometer, Hilger,</b> exactly as above, but with denser prism, i.e. 1.74 refractive index for D, and correspondingly increased accuracy of calibration, being from 390μ to 800μ.....	149.85	205.35
46868.	<b>Universal Base</b> attached to either of above. For detailed description of universal base see No. 46908.....	10.00	13.70
46872.	<b>Protecting Cover</b> for prism table.....	2.84	3.90
46874.	<b>Levelling Screws</b> .....	5.00	6.85
46876.	<b>Case,</b> with lock and key, for either of above.....	7.70	10.55
46880.	<b>Extra High-Power Eyepiece</b> with its own zero adjusting cross-hairs.....	59.40	81.40
46884.	<b>Shutter Eyepiece</b> with lateral adjustment to bright pointer.....	21.60	29.60
46888.	<b>Slide</b> with light filters to the shutter eyepiece for giving the pointer any desired color, by means of which an increase of accuracy and comfort in reading can be secured, especially in the violet part of the spectrum.....	6.75	9.25

**Note**—This eyepiece has two shutters which can be shifted from either side in the focal plane so as to cover any desired part of the field, thereby observing any bright lines which, by their proximity prevent the observation of feebler lines. The metal pointer, the extremity of which is ground exceedingly fine and polished bright with the greatest care, is illuminated from above by a mirror. This bright pointer is adjustable laterally by the two milled head screws below, so that one can always return to the standard by setting the bright pointer on a reference line.



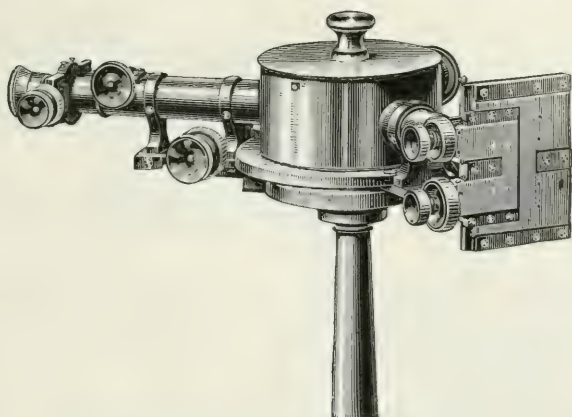
No. 46860 Hilger Wavelength Spectrometer with Camera No. 46892 Attached

46892. Camera, with 21-inch focus lens, tilting adjustment for accurately focussing the whole spectrum, and shutter for exposure. . . . .
- |                     |       |                     |       |
|---------------------|-------|---------------------|-------|
| Duty Free . . . . . | 35.90 | Duty Paid . . . . . | 49.20 |
|---------------------|-------|---------------------|-------|
46896. Telescope fixed to side of the camera, and internal mirror with external milled head by means of which the spectrum can be reflected into the telescope for observation immediately before photography. . . . .
- |                     |       |                     |       |
|---------------------|-------|---------------------|-------|
| Duty Free . . . . . | 54.00 | Duty Paid . . . . . | 74.00 |
|---------------------|-------|---------------------|-------|
46900. Replica of Rowland Diffraction Grating, interchangeable with the prism. Only supplied if ordered with the Spectrometer. Price includes calibration in wavelengths for both prism and grating. . . . .
- |                     |       |                     |       |
|---------------------|-------|---------------------|-------|
| Duty Free . . . . . | 59.55 | Duty Paid . . . . . | 81.60 |
|---------------------|-------|---------------------|-------|
46904. Apochromatic Triple Object Glasses. In place of the usual achromatic doublet object glasses extra. . . . .
- |                     |       |                     |       |
|---------------------|-------|---------------------|-------|
| Duty Free . . . . . | 35.10 | Duty Paid . . . . . | 48.10 |
|---------------------|-------|---------------------|-------|



Hilger Wavelength Spectrometer with Universal Base and Nutting Polarisation Photometer Attachment in position and Stand for two parallel beams of light

46908. Wavelength Spectrometer, Hilger Constant Deviation Type, with Universal Base, in which the base plate and tripod are of the form shown, the tripod being heavier and larger than in the ordinary Wavelength Spectrometer and the base-plate having an extended arm. The base-plate is drilled with all necessary holes for the addition of the Nutting Photometer. The Universal Base also provides for the attachment of the complete accessories for high resolving power (Michelson echelon, Lummer-Gehrcke plate, and Fabry-Perot etalon). With prism of 1.65 refractive index for D, and Universal Base. . . . .
- |                     |        |                     |        |
|---------------------|--------|---------------------|--------|
| Duty Free . . . . . | 143.10 | Duty Paid . . . . . | 196.10 |
|---------------------|--------|---------------------|--------|
46912. Wavelength Spectrometer, Hilger, with Universal Base, as above, but with denser prism, i. e., 1.74 refractive index for D. . . . .
- |                     |        |                     |        |
|---------------------|--------|---------------------|--------|
| Duty Free . . . . . | 157.95 | Duty Paid . . . . . | 216.45 |
|---------------------|--------|---------------------|--------|
- Case, with lock and key, for either of above. . . . .
- |                     |       |                     |       |
|---------------------|-------|---------------------|-------|
| Duty Free . . . . . | 10.15 | Duty Paid . . . . . | 13.90 |
|---------------------|-------|---------------------|-------|
46916. Nutting Polarisation Photometer Attachment, particularly designed for attachment to the Hilger Wavelength Spectrometer with Universal Base, as above listed. The combination results in a Spectrophotometer for the visible spectrum accurate as regards wavelength and photometric measurements. The circle is divided both in densities and degrees. The price includes an arrangement on separate stand for producing two parallel beams of light, by which means, together with an adjustment on the photometer itself, the correct conditions of illumination may be secured with two columns of liquid of any desired length. . . . .
- |                     |        |                     |        |
|---------------------|--------|---------------------|--------|
| Duty Free . . . . . | 178.20 | Duty Paid . . . . . | 244.20 |
|---------------------|--------|---------------------|--------|
46920. Nutting Photometer Attachment, as above but on separate stand with levelling screws, suitable for use with any ordinary Spectroscope. . . . .
- |                     |        |                     |        |
|---------------------|--------|---------------------|--------|
| Duty Free . . . . . | 179.55 | Duty Paid . . . . . | 246.05 |
|---------------------|--------|---------------------|--------|
46924. Stand for Tubes of Absorbing Liquids, such as Baly tubes, etc. . . . .
- |                     |       |                     |       |
|---------------------|-------|---------------------|-------|
| Duty Free . . . . . | 14.85 | Duty Paid . . . . . | 20.35 |
|---------------------|-------|---------------------|-------|



No. 46928

46928. Spectroscope, Krüss Universal, for quantitative and qualitative analysis, spectro-photometry, etc. Large model with flint glass prism of 60° and triple Rutherford prism, providing a great range of dispersion. Micrometer adjustment for observation telescope, etc. Equipped for qualitative analysis with simple micrometer slit, with divided drum and platinum edges, comparison prism and lamp for illumination of scale. Equipped for quantitative analysis and photometry with micrometer double slit, with two divided drums after Vierordt, adjustable eye-piece, absorption vessel with parallel walls, Schultz's cell, micrometer support and observation lamp. With two unsymmetrical slits.

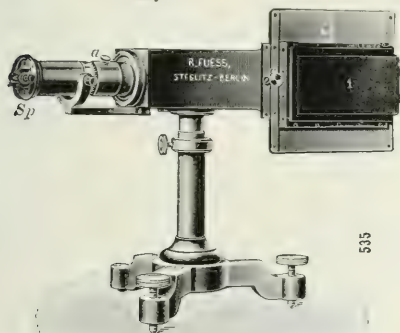
Duty Free..... 157.50

Duty Paid..... 210.00

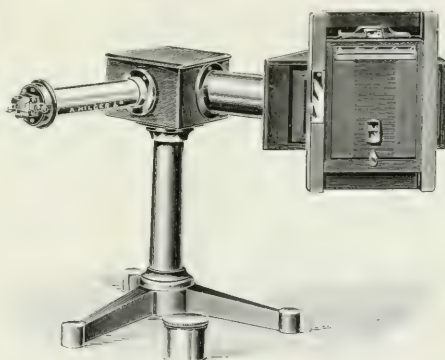
46932. Spectroscope, Krüss Universal, exactly same as above but with two symmetrical slits

Duty Free..... 190.50

Duty Paid..... 254.00



No. 46936



No. 46944

46936. Spectrograph, Fuess, Gehrke and Reichenheim, as used at the Physikalisch-Technische Reichsanstalt. With optical system of quartz for investigations of the ultra-violet. For photographic plates 6½ x 9 cm. A small compact instrument which has been supplied to many leading chemical and physical laboratories in Europe and America. Complete with extra large Cornu prism.

Duty Free..... 142.50

Duty Paid..... 190.00

46940. Spectrograph, Fuess, identical with above but with glass lenses and two dense flint glass prisms.  $n_D = 1.75$  for investigations of visible spectra.

Duty Free..... 120.00

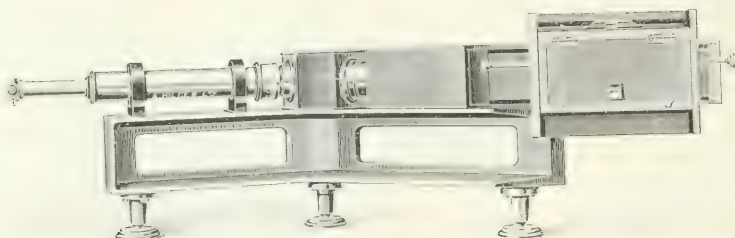
Duty Paid..... 160.00

46944. Spectrograph, Hilger, for the Ultra-Violet, with optical system of Uviol glass. Recommended as an inexpensive outfit for ultra violet work, having been used very successfully for experiments in blood, absorption spectra, etc. Each instrument is sent out in complete adjustment ready for photographs to be taken. Specimen photographs sent on application. With two prisms and lenses of the most transparent ultra-violet glass, the lenses of 8 inch (203 mm) focus, the spectrum from 300  $\mu$  to 800  $\mu$ , about 40 mm in length. Size of plate 4½ by 3½ inches.

Duty Free..... 89.10

Duty Paid..... 122.10





No. 46948

16948. **Spectrograph, Hilger, for the Ultra-Violet, Size C**, with quartz optical system; designed to be in permanent adjustment; to give the whole spectrum from  $200\ \mu$  to  $800\ \mu$  on one plate; to give good definition over the whole spectrum on the ordinary photographic plate and to give as large an amount of light as is consistent with the above conditions, thus enabling spectrograms to be taken with relatively short exposures. The instruments are sent out completely adjusted, ready for photographs to be taken. Specimen photographs will be sent on application. With lenses of 24 inches (610 mm) focus, the instrument giving a spectrum from  $210\ \mu$  to  $800\ \mu$  of about 200 mm in length; prism 41 mm high by 65 mm length of face; size of plate  $10 \times 4$  inches; with No. 2 Slit. The dispersing system consists of one Cornu prism. There is a vertical motion by rack and pinion to the dark slide, with scale, whereby a number of exposures can be taken one below the other.

Duty Free..... 317.25

Duty Paid..... 434.75

16952. **Wavelength Scale for above Spectrograph** mounted internally in such a manner as to be brought at will in contact with the photographic plate. Illumination is provided by means of a small electric lamp, and a contact print of the wavelength scale can thus be obtained on the same plate as, and in juxtaposition to, the photograph of the spectrum. The above Quartz Spectrograph in connection with the wavelength scale is widely used for experiments in the absorption of light of complex chemical substances and in the study of molecular constitution. If desired the scales can be divided to read frequencies instead of wavelengths, the price being the same. Price applies only if ordered with Size C Spectrograph, including small battery in case with push key for illuminating lamp; the whole being attached to the Spectrograph in a convenient position for use.

Duty Free..... 70.20

Duty Paid..... 96.20

16956. **Wavelength Scale on Glass, for above Spectrograph.** These scales are photographed on glass and can be laid direct on the spectrograms to read off the wavelengths. They are prepared to suit each individual instrument and are sufficiently accurate to determine the identity of most lines.

Duty Free..... 8.10

Duty Paid..... 11.10

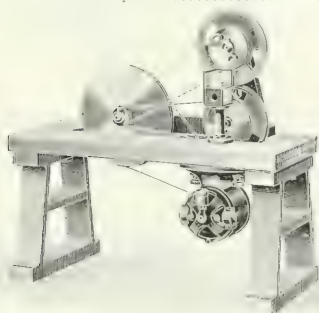
16960. **Metal Slides for the Plate-holder for above Spectrograph**, same being attached to the base of the instrument by a rigid metal bracket. In this construction the wooden cone and bellows of the camera are still retained, but play no part in the support of any essential portions of the apparatus.

Duty Free..... 94.50

Duty Paid..... 129.50

36964.

**Sector Photometer, Hilger, for Quantitative Spectrophotometry in the Ultra-Violet** in connection with the Hilger Ultra-Violet Spectrograph Size C. With wavelength scale by the measurements of the actual proportion of each wavelength absorbed in its passage through the substance or for some function of it, as for instance the absorption constant. The great interest which the measurement of selective absorption has assumed for the chemist will be noted from the extensive bibliography concerning the chemical significance of the absorption spectra of organic compounds and rare earths. Much of this work has been unsatisfactory because it has not been of a quantitative character. The Sector Photometer consists of a slit and a bi-prism which receives the light from the solution through the substance to be examined and the rotating sector so that two spectrum photographs are obtained in close juxtaposition, one of which is of reduced density throughout its whole length and the other—that which has passed through the material



No. 46964

under test—being more dense than the first in certain parts and less so in others, there being certain wavelengths where the density of the two is equal. Spectrum photographs and more complete description, with complete bibliography, will be sent upon application. With motor for either 110 or 220 volt circuit. Voltage must be specified in ordering.

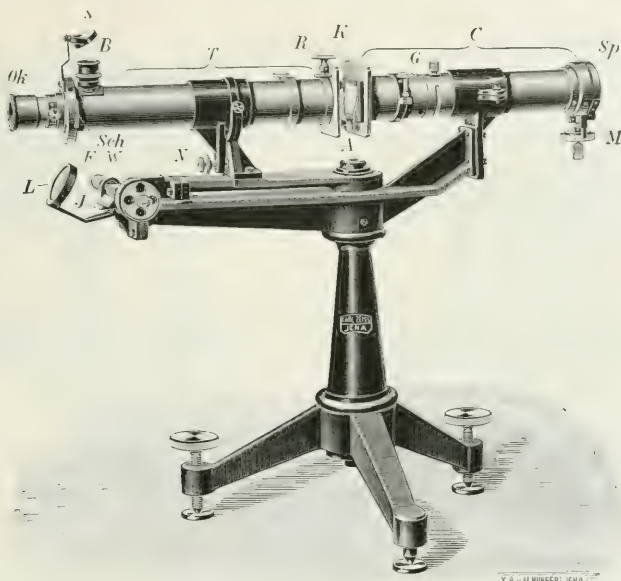
Duty Free..... 145.80

Duty Paid..... 199.80

16968. **Tubes, with quartz ends, for solutions, length of liquid 10, 20 or 40 mm.**

Duty Free, each..... 4.05

Duty Paid, each..... 5.55



No. 46970

**SPECTROSCOPE, GRATING, ZEISS**, primarily designed for the analysis of absorption spectra but applicable at the same time to the study of emission spectra. In grating spectra the wavelength for any line of the spectrum is proportional to the corresponding angle of deflection, and this property has been made a means of dividing the head of the micrometer screw by which the telescope is moved through the spectrum in terms of wavelengths. Using none but the most perfect gratings, Zeiss have been enabled by the excellent definition of the spectra to depart from the usual division in terms of  $\mu\mu$  or millionths of a millimeter and have divided the drum into units which are ten times finer, i.e. into Angstrom units ( $1 \text{ \AA} = 0.1 \mu\mu$ ). The Fraunhofer lines of the solar spectrum can accordingly be set accurately to within  $1-2 \text{ \AA}$ . For sharply focusing the spectrum with respect to the cross lines in the telescope the collimator is very rigidly mounted and fitted for this purpose with a milled ring. The slit, which is of the highest order of precision, moves symmetrically and can be adjusted during observations by means of a wheel and cord transmission gear. The jaws of the slit are protected from the access of dust and accidental injury by a detachable glazed cap, the latter being interchangeable with a similar cap fitted with a comparison prism. Each division of the slit drum, which has one hundred divisions, changes the width of the slit by an amount equal to  $0.01 \text{ mm}$ .

When the instrument is applied to the analysis of absorption spectra the absorption bands are much more clearly defined owing to the comparatively small dispersion of the grating, which contributes greatly to the accuracy with which it can be adjusted with respect to the cross lines. This renders the instrument particularly well adapted for the spectroscopic analysis of pigments by Formánek's method. To render the cross lines clearly visible in the presence of very dark absorption bands the telescope is fitted with a convenient device for illuminating the cross lines, which entirely fulfils the purpose of the arrangement recommended by Formánek, though it differs from it in the means adopted by Zeiss.

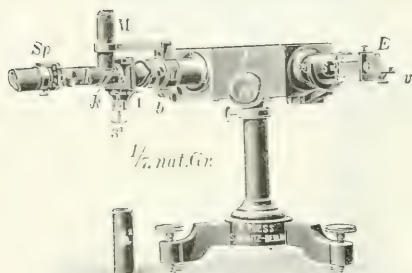
The most suitable source of light is a Nernst lamp with exposed glower, i.e. a glower not surrounded by a heating spiral, an image of the glower in its natural size being projected upon the slit by means of a condenser lens. With this source of light the slit should as a rule be reduced to a width of  $0.02$  to  $0.03 \text{ mm}$ . An inverted incandescent gas burner supported on a stand and provided with screen is equally convenient to manipulate, though it gives a less intense light than the Nernst lamp.

Spark spectra and arc spectra are examined by projecting with the aid of a converging lens an image of the radiant upon the jaws of the slit, which for this purpose are lacquered white. Care should be taken to insure that the exit pupil of the telescope may be completely filled with light. This may be ascertained by viewing the small bright circle in front of the eyepiece with a magnifier. See F. Löve, *Zeitschr. f. Instrumentenkunde* 1903, 23 S. 261; or J. Formánek "Untersuchung und Nachweis organischer Farbstoffe auf spektroskopischem Wege," II Auflage, Berlin 1903, or "Die qualitative Spektralanalyse anorganischer und organischer Körper" II Auflage.

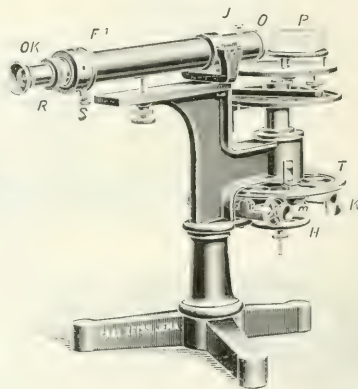
**Grating Spectroscope**, as above, with transmission grating, protecting cap for the slit, comparison prism, reader for the micrometer screw and two interchangeable eyepieces of different foci, in case with lock and key.

Duty Free..... 200.00

Duty Paid..... 272.00

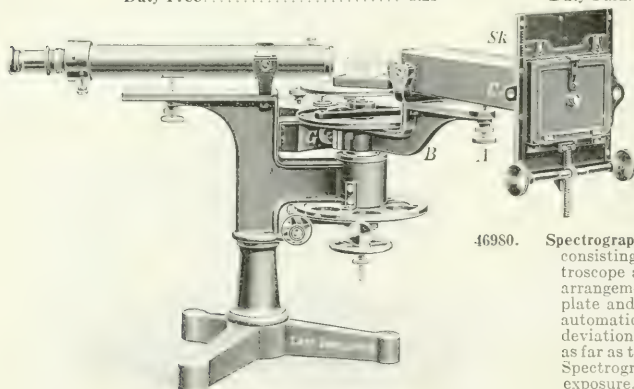


No. 46972



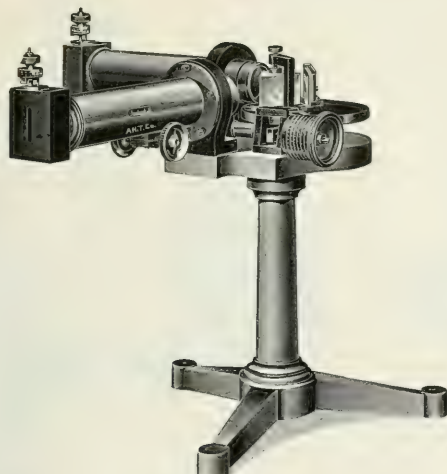
No. 46974

46972. **Monochromator, for Visible Rays, Fuess.** Convenient as a source of homogeneous light for spectrometers, refractometers, polariscopes, microscopes, goniometers, etc. Illustration shows same in position before the collimator tube of a spectrometer. With two flint prisms  $n_D = 1.67$ , and with two Ramsden oculars with cross hairs. See E. A. Wülfing, *Tschermak's Mineral u. petrogr. Mitt.*, 15, S. 74; ferner: C. Leiss, *Zeitschr. f. Instr. Kunde*, 18, S. 209; ferner: C. Leiss, *Die opt. Instr.*, S. 25, Fig. 19-21.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 162.90 | Duty Paid | 217.20 |
|-----------|--------|-----------|--------|
46974. **Spectroscope, Autocollimation, Zeiss.** Light reaches one-half of the slit through the window at F, while a similar window on the left admits light to the other half of the slit, and thence passes through the objective O to the prism P, where it is reflected back from one of the silvered faces and in the focal plane of the objective O produces a spectrum which can be passed through the field of view of the fixed telescope by turning the screw head M. The arrangement of the two windows furnished a convenient means of comparing two spectra. Wavelengths can be accurately measured within a fraction of a  $\mu$  by reference to spectrum lines of known wavelengths, while for the identification of the various regions of the spectrum a dispersion curve is furnished by the double Rutherford prism. With double Rutherford prism and dispersion curve.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 185.00 | Duty Paid | 251.60 |
|-----------|--------|-----------|--------|
46976. **Prism of  $30^\circ$ , on silvered back with metal stage, for use interchangeably with Rutherford prism.**
- |           |      |           |       |
|-----------|------|-----------|-------|
| Duty Free | 8.25 | Duty Paid | 11.22 |
|-----------|------|-----------|-------|

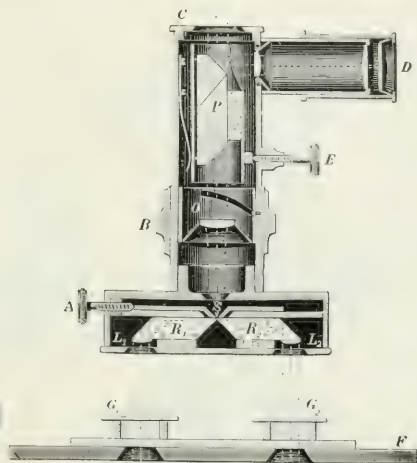


No. 46980

46980. **Spectrograph with Divided Circle, Zeiss.** consisting of the Autocollimation Spectroscope above, with metal camera with arrangement for ten exposures on one plate and a base plate for the prism for automatically obtaining the minimum deviation. The objectives are inserted as far as they will go by which means the Spectrograph is focused and ready for exposure. With a  $6 \times 9$  cm plate holder, but without objectives and prisms.
- |           |        |           |        |
|-----------|--------|-----------|--------|
| Duty Free | 206.25 | Duty Paid | 280.50 |
|-----------|--------|-----------|--------|
46982. **Pair of Achromatic Objectives,  $f = 250$  mm., with fittings to slide into the collimator and camera.**
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 15.00 | Duty Paid | 20.40 |
|-----------|-------|-----------|-------|
46984. **Pair of Double Quartz-Fluorite Achromatic Objectives,  $f = 250$  mm., for use in the ultra-violet.**
- |           |       |           |       |
|-----------|-------|-----------|-------|
| Duty Free | 47.50 | Duty Paid | 64.60 |
|-----------|-------|-----------|-------|
46988. **Rutherford Prism, on base plate.** Duty Free 25.00 Duty Paid 34.00
46990. **Cornu Double Prism, on base plate.** Duty Free 22.50 Duty Paid 30.60
46992. **Condenser, with quartz lens, on stand.** Duty Free 18.75 Duty Paid 25.50



No. 46991



No. 46996

- 46994. Monochromatic Illuminator, for the Ultra-Violet Light and Visible Rays, Hilger, reading from  $200\mu$  to  $700\mu$  in direct wavelengths.** This instrument is particularly suitable for experiments on the photo electric effect, etc. The collimator and telescope both have symmetrical slits with divided drum heads for width adjustment of the jaws which have an effective length of 20 mm. The lenses are of 31 mm aperture and 210 mm focal length for  $\lambda = 300\mu$ . The beam of light from the collimator passes at minimum angle through a Cornu prism of quartz (height 32 mm, length of face 42 mm) and is then reflected from a plane mirror into the telescope. The prism and mirror stand on one table, which is rotated by means of a fine steel screw, the wavelength of the portion of the spectrum under observation being read off direct on a helical drum. The average accuracy of reading throughout the range is to about  $1\mu$ . The collimator and telescope are rigidly fixed to the cast-iron base.

Duty Free..... 279.18

Duty Paid..... 332.58

Note—This instrument may be converted into a spectrometer for infra-red rays by the addition of rocksalt prism, two nickel-steel concave mirrors, thermopile, etc. Price upon application.

- 46996. Spectroscope, Comparison, Zeiss, for the convenient comparison of the absorption spectra of fluids, glasses, ray filters, etc.** In case with a number of lithographs of wave length scale for guidance in observations. The illustration shows the optical arrangement only, the whole being mounted on an adjustable upright support with base, for convenient manipulation.

Duty Free..... 77.50

Duty Paid..... 105.40

- 46998. Spectroscope, Comparison, Zeiss, with triple field, i.e. for the simultaneous observation of three spectra.** Similar in construction to the preceding. This instrument is intended for practical color analysis in the arts, such as three color photography, three color printing and also physiological investigations on color sensations, etc. For more detailed description send for Mess 260. In case with lock and key.

Duty Free..... 93.75

Duty Paid..... 127.50

- 47000. Cylindrical Absorption Cells, for use with either of above with cover glasses, with height of fluid 1 mm, 5 mm, 10 mm and 20 mm.**

Duty Free, per set..... 3.00

Duty Paid, per set..... 4.08

- 47002. Absorption Cell, for variable fluid height**

Duty Free..... 8.75

Duty Paid..... 11.90



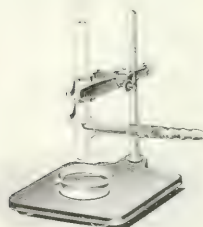
No. 47004

- 47004. Hand Spectrophotometer, Nutting, Model I, a combination of direct vision pocket spectroscope with polariscope consisting of two Nicol prisms.** Dispersion of Amici prism  $C - F = \text{ca. } 5^\circ$ . See P. G. Nutting, Bulletin of U. S. Bureau of Standards, Vol. 2, No. 2, p. 317, Fig. 1 u. 2, 1906; ferner: C. Leiss, Zeitschr. f. Instr. Kunde 26, S. 307, 1906.

Duty Free..... 27.00

Duty Paid..... 36.00

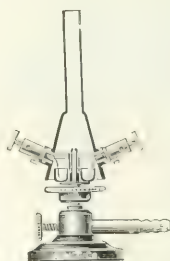




No. 47008



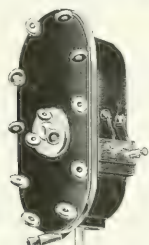
No. 47012



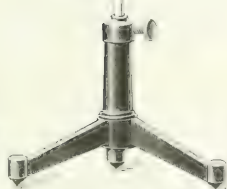
No. 47016



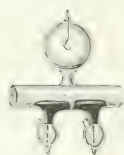
No. 47020



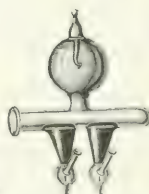
No. 47024



No. 47028



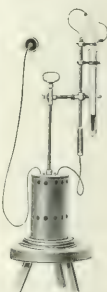
No. 47032



No. 47036



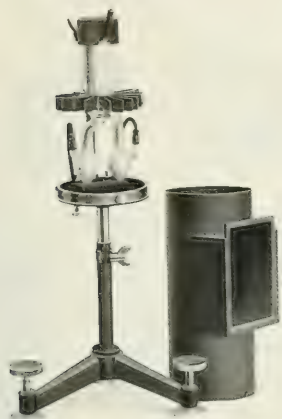
No. 47040



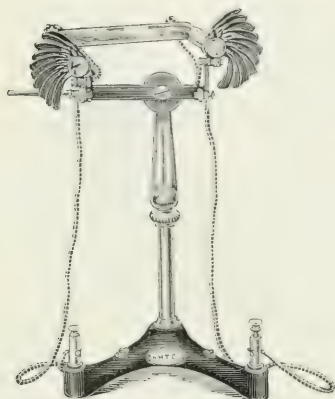
No. 47044

# Spectroscope Accessories.

47008.	Spectrum Burner, Beckmann. A simple and practical method for coloring a Bunsen flame by means of chemical vapors. See <i>Zeitschrift für angewandte Chemie</i> , XX Jahrgang 1907, Heft 14, Seite 564. Complete with stand and porcelain dish.	4.00
47012.	Spectrum Burner, Riesenfeld. A new, low priced burner for producing vapors from chemical solutions for coloring spectral flames.	3.00
47016.	Spectrum Burner, Riesenfeld and Wohlers for electrolytic vaporizing.	6.00
47020.	" Lamp, Riesenfeld, for spark spectra. By means of an iridium electrode a pure spectrum of the metal containing solution to be investigated is secured without the presence of air lines or of iridium lines. Price does not include iridium electrode which is supplied at the market price.	31.50
	Duty Free.....	22.50
47024.	Mercury Vapor Lamp, Lummer-Straubel, for 25 to 30 volts direct current.	8.00
	Duty Free.....	6.00
47028.	Stand and Cooling Bath, for above.	15.50
	Duty Free.....	10.25
47032.	Mercury Vapor Lamp, Lummer-Straubel, with quartz window on tube for the ultra violet.	13.65
	Duty Free.....	9.25
47036.	Cooling Cell, for use with above, of dark glass, with quartz window, hard rubber top, etc	9.75
	Duty Free.....	6.50
47040.	Mercury Vapor Lamp, Immersion Type of Uviol Glass, on stand with resistance for 110 or 220 volt circuit. Current, volts.....	33.50
	Duty Free.....	30.50
	Duty Paid.....	43.50
47044.	Extra Uviol Lamp, only for above.	47.50
	Duty Free.....	8.00
	Duty Paid.....	13.50



No. 47048



No. 47052

47048. **Mercury Vapor Lamp, Perot-Fabry**, with protecting cylinder with rectangular opening 9 x 12 cm to take Ray Filters, etc. The lamp is provided with a cooling ring consisting of radial arms of blackened brass and copper. The entire lamp is mounted on adjustable stand with levelling screws and the whole makes a very convenient source of light for polariscope, spectroscope and other laboratory purposes where a monochromatic beam of short wave-length is desired.

Duty Free ..... 21.00 Duty Paid ..... 28.00

**MERCURY VAPOR ARC LAMP OF QUARTZ, HERAEUS.** On 220 volt lines the lamp may be burned at all potentials between the electrodes from 25 to 185 volts by means of a variable resistance of 55 or 95 ohms (depending on the type of lamp) connected in series; on 110 volt lines at all potentials from 25 to 80 by means of a variable resistance of 25 or 40 ohms. If the lamp is not required to burn at low voltages resistances of 30 or 50 ohms and of 12 or 20 ohms are sufficient. The specific intensity of the visible and ultra-violet radiation is the same, and the economy equally as good in 110 volt as in 220 volt lamps. The mercury vapor arc is extremely rich in ultra-violet rays and quartz glass is transparent for such rays above 185  $\mu$  wave-length. See article in the "Annalen der Physik," 4th Series, Vol. 20, 1906, by Dr. R. K $\ddot{u}$ ch and T. Retschinsky on Photometric and spectro-photometric measurements in the high pressure mercury vapor lamp.

For 220 volts, direct current, 12 cm arc.  $3\frac{1}{2}$  amp. current consumption and 3000 c. p.

47052.	Lamp, complete on stand.....	145.00
47056.	Rheostat, adjustable series, large, 55 ohms.....	15.00
47060.	"    "    small, 30 ohms.....	10.65
	2 amp. current consumption and 1500 c. p.	
47064.	Lamp, complete on stand.....	125.00
47068.	Rheostat, adjustable series, large, 95 ohms.....	10.65
47072.	"    "    small, 50 ohms.....	8.50
	For 110 volts, direct current, 7 cm arc. $3\frac{1}{2}$ amp. current consumption and 1500 c. p.	
47076.	Lamp, complete on stand.....	125.00
47080.	Rheostat, adjustable series, large, 25 ohms.....	10.65
47084.	"    "    small, 12 ohms.....	8.50
	2 amp. current consumption and 800 c. p.	
47088.	Lamp, complete on stand.....	105.00
47092.	Rheostat, adjustable series, large, 40 ohms.....	6.15
47096.	"    "    small, 20 ohms.....	6.15

**Note**—These are direct current Lamps and cannot be run with alternating current. Because of the extremely fragile nature of these Lamps packing is charged extra at cost and while it is carried out with the greatest care, Lamps are shipped at buyer's risk only. They can be specially insured against breakage in transportation at the following rates:—

1000 miles, or under.....	4.00
1000 to 2000 miles.....	6.00
Over 2000 miles.....	8.00

47100. **Ray Filters, Wratten & Wainwright, Set of Eight for Spectroscopy**, consisting of filters for removing of ultra-violet, transmission of only red, etc. Cemented in glass, 2 inches square, in case.  
Duty Free ..... 7.45 Duty Paid ..... 10.05
47104. **Ray Filters, Wratten & Wainwright, Complete Set of Fifty-one**, in mahogany case. Filters 2 inches square, cemented between optical glass of good quality, containing all the filters required for contrast, photomicrography or spectroscopy.  
Duty Free ..... 67.50 Duty Paid ..... 91.15



No. 47108



No. 47112



No. 47116



No. 47120



No. 47124

47108. Prism, Hollow, with faces of highly polished mirror glass and glass stopper; cemented together in an electric furnace and resistant to heat, acids and alkalies; with transparent opening through faces 25 mm in diameter. . . . . 6.00
47112. Spectrum Cells, for absorption spectra, etc., bottle form, with ground in stopper and plane parallel sides. . . . . 1.60
47116. Spectrum Cells, for absorption spectra, etc., largest size being suitable for lantern experiments. Inside dimensions, mm. . . . . 30 x 20 x 5    30 x 20 x 10    100 x 80 x 8
- Each. . . . . 1.15    1.50    2.70
47120. Spectrum Cells, for absorption, with round opening 20 mm in diameter by 4 mm deep. . . . . 1.00
47124. " " with lid cemented on and with a small ground in stopper, 40 x 40 x 10 mm. . . . . 4.00
47128. Spectroscope Prisms, Hilger, 60° Angle, accurate to within 10', with rectangular faces and with the ratio of the length of surface becoming greater in proportion to the height as the refractive index increases, thus securing a more satisfactory and effective aperture.

# Light Flint

Refractive index for D=1.58 to 1.62 (approximately)

Length of face		Height of prism		Price	
inches	mm	inches	mm	Duty Free	Duty Paid
1 1/8	32	1	25	6.53	8.95
1 3/8	42	1 1/4	32	8.91	12.21
2	51	1 1/2	38	12.62	17.29
2 3/8	60	1 3/4	44	17.82	24.42

# Dense Flint

Refractive index for D=1.63 to 1.65 (approximately)

Length of face		Height of prism		Price	
inches	mm	inches	mm	Duty Free	Duty Paid
1 1/8	35	1	25	8.91	12.21
1 3/8	44	1 1/4	32	10.09	13.83
2	54	1 1/2	38	14.25	19.53
2 3/8	64	1 3/4	44	19.89	27.26

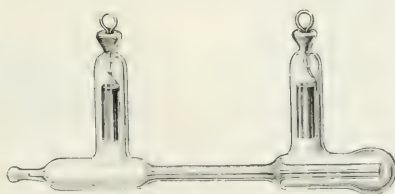
47132. Spectroscope Prisms, Hilger Right-Angle, of white, clear and thoroughly annealed crown glass, with guaranteed definition and angles accurate to within 5'. Length of square cathetus surface, mm. . . . . 10    15    20    25    30
- Each, Duty Free. . . . . 4.75    7.43    10.40    13.36    16.34
- Each, Duty Paid. . . . . 6.51    10.18    14.25    18.32    22.40
47136. Quartz Prisms, Cornu, refracting angle of 60°, composed of two prisms of right and left rotation quartz, respectively, each of 30° angle. This improved construction results in greater optical perfection, removal of double image caused by reflection between the two inside surfaces without the necessity of any liquid between the two surfaces, a gain in light transmitted and greater convenience in handling.
- Height of prism. . . . . 19 mm    32 mm    42 mm
- Length of external faces. . . . . 25 mm    25 mm    32 mm
- Duty Free. . . . . 20.79    28.51    48.13
- Duty Paid. . . . . 28.49    39.07    65.95
47140. Quartz Lenses, unmounted, accurately cut with the crystallographic and optical axes coincident; of the finest definition, the focal length for wavelength 400  $\mu$  being not less than ten times the diameter.
- Clear aperture, mm. . . . . 25.4    32    44    51    57    64
- Duty Free. . . . . 11.88    13.37    15.44    17.82    21.98    29.70    40.10
- Duty Paid. . . . . 16.28    18.32    21.16    24.42    30.12    40.70    54.40
47144. Quartz Lenses, plano-convex, second quality, suitable for condensing lenses, etc.
- Diameter, inches. . . . . 1    1 1/4    1 1/2    1 3/4    2    2 1/4
- Focal length, inches. . . . . 3    3 3/4    4 3/4    5 1/4    6    6 3/4
- Duty Free. . . . . 4.46    5.80    7.13    8.91    13.07    18.71
- Duty Paid. . . . . 6.10    7.94    9.77    12.21    17.91    25.64
47148. Rocksalt, Prism, 60° length of face 32 mm, height of face 25 mm.
- Duty Free. . . . . 20.52    Duty Paid. . . . . 28.11
47152. Rocksalt, Lenses, with second quality surfaces, focal length for D not less than five times the diameter.
- Diameter. . . . . 25 mm    31 mm    38 mm    44 mm
- Duty Free. . . . . 5.64    6.24    7.13    8.32
- Duty Paid. . . . . 7.73    8.55    9.77    11.40
- Note—First quality Lenses of Rocksalt, focal length for D not less than 1 1/2 times the diameter, curves such as to give minimum spherical aberration for wavelength 10  $\mu$ , price 2 1/2 times that of above.
47156. Gratings, Replica, made from Rowland originals, each in case.
- Number of lines. . . . . 15,000    14,438    15,000
- Size, inches. . . . . 1 1/4 x 1 1/4    1 1/4 x 1 1/4    1 1/4 x 1 1/4
- Each. . . . . 6.00    5.00    11.00



No. 47160

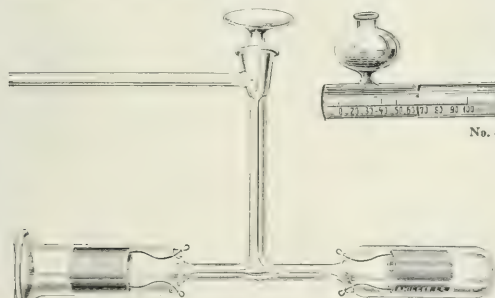


No. 47168



No. 47172

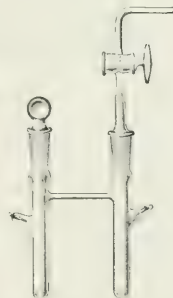
47160. Spectrum Tubes, Plucker, with simple electrodes. Filled with either O, H, NO, CO, CO<sub>2</sub>, Cl, Cy, CH<sub>4</sub>, I or Br. Each..... 2.00
47164. Spectrum Tubes, Plucker, with simple electrodes. Filled with either Helium or Argon at  $\frac{1}{2}$  to 5 mm pressure. Each..... 5.00
47168. Spectrum Tubes, Plucker, empty, with simple electrodes and two Jena stopcocks ground absolutely tight, for filling in the laboratory with any desired gas. Each..... 3.00
47172. Spectrum Tubes, Dorn-Goetze, with square cut end of capillary, as used for observation of anode and cathode ray, with cylinder electrodes of large capacity. Particularly recommended for the investigation of rare gases. Filled with either O, H, N, NO, N<sub>2</sub>O, NO<sub>2</sub>, NH<sub>3</sub>, H<sub>2</sub>O, ordinary air CO, CO<sub>2</sub>, SO<sub>2</sub>, Br, Cl, Si Fl<sub>2</sub>, Sn Cl<sub>4</sub>, H<sub>2</sub>S, Cy, HCY, C<sub>2</sub>H<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>, CH<sub>4</sub>, CS<sub>2</sub> or with solids I, G, Se, Hg or Hg<sub>2</sub>G. Duty Free, each..... 2.75 Duty Paid, each..... 4.15
47176. Spectrum Tubes, same as No. 47172 but filled with following rare gases.
- | Filled, with..... | Helium | Argon at low pressure | Argon at high pressure | Neon | Krypton | Xenon |
|-------------------|--------|-----------------------|------------------------|------|---------|-------|
| Duty Free.....    | 4.50   | 4.50                  | 8.00                   | 6.00 | 20.00   | 27.00 |
| Duty Paid.....    | 6.75   | 6.75                  | 12.00                  | 9.00 | 30.00   | 35.00 |
47180. Spectrum Tubes, same as No. 47172, empty, with two stopcocks, for filling in the laboratory..... 3.75
47184. Spectrum Tubes, Dorn-Goetze, exactly same as No. 47172 but made of Uviol glass transparent to the ultra-violet up to 2530 Å. E., and filled with the same gases or material as No. 47172. Duty Free, each..... 3.75 Duty Paid, each..... 5.75
47188. Spectrum Tubes, same as No. 47184 but filled with the following rare gases.
- | Filled with..... | Helium | Argon at low pressure | Argon at high pressure | Neon  | Krypton | Xenon |
|------------------|--------|-----------------------|------------------------|-------|---------|-------|
| Duty Free.....   | 5.50   | 5.50                  | 9.00                   | 7.00  | 21.50   | 25.00 |
| Duty Paid.....   | 8.25   | 8.25                  | 13.50                  | 10.50 | 32.00   | 37.00 |
47192. Spectrum Tubes, same as No. 47184, empty, with two stopcocks for filling in the laboratory..... 5.25



No. 47196



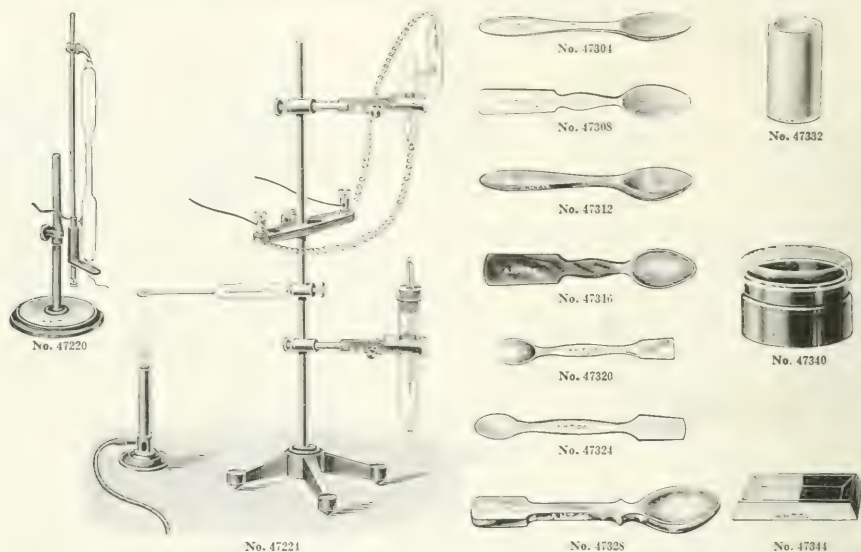
No. 47200



No. 47216

47196. Spectrum Absorption Tube, Baly, consisting of two tubes with polished quartz ends, the outside tube being graduated in mm. Complete with two quartz plates and rubber tubing..... 7.50
47200. Spectrum Tube, End-on Type for experimental work, with stopcock and condenser to concentrate the beam. The spherical portion of the condenser is fitted air-tight to the ground and polished cup at the end of the vacuum tube; with glass condenser. Duty Free..... 13.52 Duty Paid..... 18.52
47204. Spectrum Tube, same as above, with quartz condenser. Duty Free..... 22.43 Duty Paid..... 30.73
47208. Spectrum Tube, Pure Fused Silica, End-on Type, for ultra-violet work, with secure mercury seals. Unfilled, with tube for exhaustion. Duty Free..... 15.60 Duty Paid..... 21.37
47212. Spectrum Tube, Pure Fused Silica, with external electrodes, which, while they do not give as brilliant a discharge as the usual form, have the advantage of absolute permanence. Unsealed, for experimental purposes, with tube for exhaust. Duty Free..... 5.35 Duty Paid..... 7.33
47216. Spectrum Tube, with ground stopper and stopcock, for Dupre's test for mercury in gun-cotton. Duty Free..... 3.38 Duty Paid..... 4.63





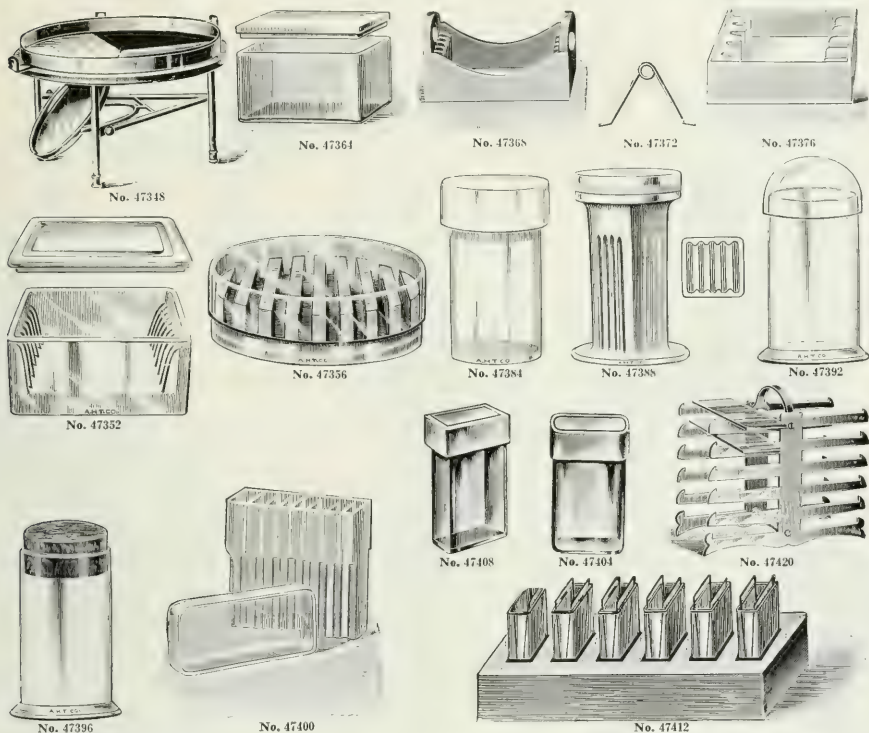
47220. Spectrum Tube Holder for Plucker tubes, without tubes. .... 6.00  
 47224. Spectrum Tube Support, Universal, with two clamps, binding post, with platinum wire, complete as per illustration but without spectrum tubes, or Bunsen burner. .... 8.00  
 47228. Photographic Plates, Wratten and Wainwright, very sensitive, for use in spectrographic work. These are supplied in the following grades.

Panchromatic "A," sensitive from the ultra-violet up to 6800 Å. u.  
 " " "B," rather less green sensitive than Panchromatic "A," but sensitive to about 7800 Å. u.  
 Wratten "M," of similar sensitiveness to Panchromatic "A," but of much finer grain and about one-third the speed.  
 Allochrome, evenly sensitive to about 5600 Å. u.  
 Double Instantaneous, a fast "ordinary" plate of fine grain suitable for ultra-violet work.

Grade.....	Panchromatic "A"	Panchromatic "B"	Wratten "M"	Allochrome	Double Instantaneous
Size $4\frac{1}{2} \times 3\frac{1}{4}$ inches, per doz. ....	.55	.85	.55	.55	.55
" 10 x 4 " " per doz. ....	1.65	2.50	1.65	1.65	1.65
" 6 x 9 cm. per doz. ....	.50	.75	.50	.50	.50
" $6\frac{1}{2} \times 9$ cm. per doz. ....	.50	.75	.50	.50	.50

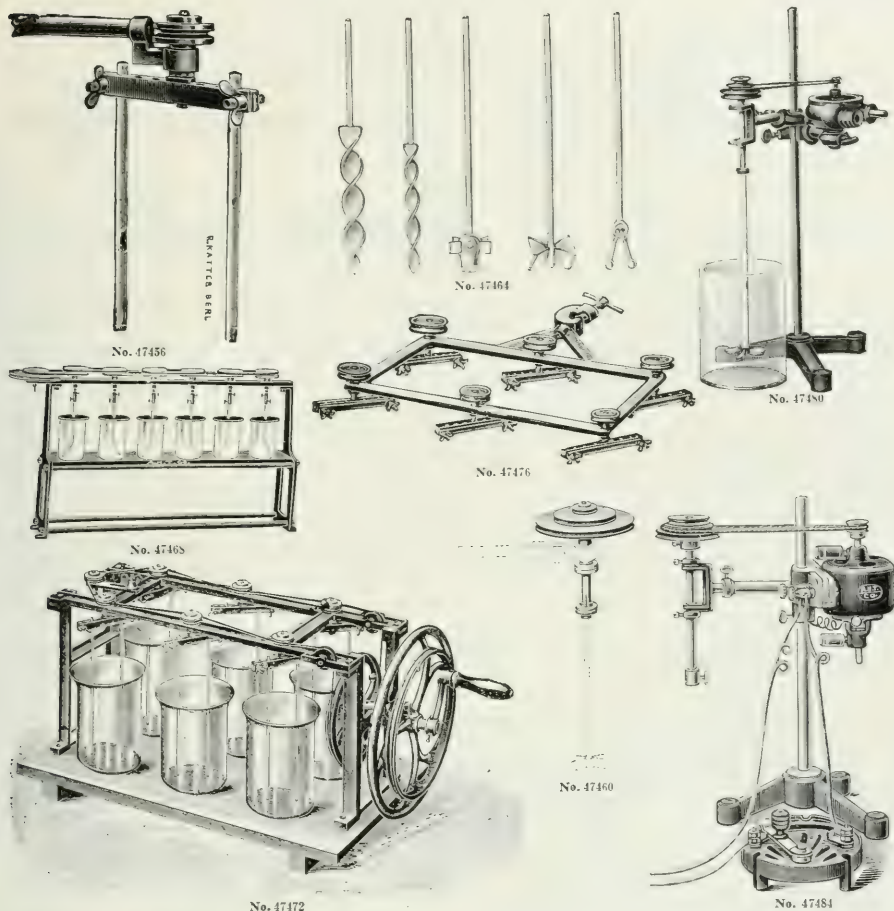
47300. Sponges, for laboratory use; \$1.50 to \$5.00 per lb., depending upon quality.

47304.	Spoons, Bone. Length, mm. ....											100	120	150	170						
	Each. ....											.12	.15	.25	.30						
47308.	Spoons, Bone, with spatula end. Length, mm. ....											100	120	150	170						
	Each. ....											.15	.20	.25	.30						
47312.	Spoons, Horn. Length, mm. ....											80	100	120	150	180	200	220	240	280	300
	Each. ....											.08	.10	.12	.15	.20	.25	.30	.35	.50	.75
47316.	Spoons, Horn, with spatula end. Length, mm. ....											80	100	120	150	180	200	220	240	280	300
	Each. ....											.12	.13	.15	.18	.25	.30	.40	.50	.75	1.00
47320.	Spoons, Pure Nickel, with spatula end. Length, mm. ....																			120	150
	Each. ....																			.50	.65
47324.	Spoons, Porcelain, with spatula end. Length, mm. ....											105	120	145	160	200	220	280			
	Each. ....											.14	.17	.20	.25	.40	.45	.80			
47328.	Spoons, Heavy Cut Glass. Size ....											Teaspoon			Dessertspoon		Tablespoon				
	Each. ....											.30			.50		.90				
47332.	Sputum Bottles. A heavy, green glass bottle, 2 inches high and 1 inch in diameter, for mailing sputum and other samples inside of mailing tubes as required by the U. S. Post Office Department. Widely used in Board of Health work. Without corks. Per gross. ....														4.00						
47336.	Sputum Bottles, same as No. 47332 but with corks to fit tight. Per gross. ....														4.70						
47340.	Sputum Dish, for sputum examinations, of black glass, with transparent glass lid, 2½ inches in diameter by 1½ inches high. ....														.25						
47344.	Sputum Tray, for sputum analysis, of porcelain, half white and half black. ....														.75						



47348. Sputum Dish, for sputum examinations, of glass, with bottom divided into three sections, one being transparent, one of milk glass and one of black glass. On metal frame with mirror underneath for reflecting light. **Duty Free.** 10.00 **Duty Paid.** 14.50
47352. Staining Dishes, of glass, for staining specimens on the slide, with loose fitting cover and grooves to keep slides in place. Inside dimensions are 75 x 58 mm so that slides of varying widths may be handled. .25
47356. Staining Dishes, Moore, of glass, for staining, dehydrating, etc., consisting of a double dish 100 mm in diameter by 30 mm deep, with parallel slots. .75
47360. Staining Dish, of glass, for staining specimens on the slide, consisting of a rectangular glass box with cover, a removable tray and a nickel spring wire holder for lifting tray out of staining solution in box. Will take slides 3 x 1 inches, 3 x 1½ inches and 3 x 2 inches. Complete with glass dish, removable tray and wire holder. 1.25
47364. Glass Dish, only. .50
47368. " Tray, only. .65
47372. Nickel Wire, holder only. .10
47376. Staining Dish of glazed porcelain, low form, for 3 x 1 slides. .80
47380. " " " for 3 x 1½ slides. 1.15
47384. Staining Jar, with loose cover and bottom polished; size 85 x 35 x 15 mm. .25
47388. " Coplin, of heavy glass, with ground on cover, for convenient manipulation of sections attached to slides; very economical of reagents; capacity ten 3 x 1 slides. Each. .25  
Per gross. 25.00
47392. Staining Jar, so-called "Naples Jar," with loose fitting hemispherical cover; size 90 x 35 mm. .20
47396. " same as above but with cork stopper and without cover. .15
47400. Staining Jar, Hellendahl, with eight compartments each of which will take two 3 x 1 slides at one time when placed back to back; very economical of solution, with cover. 1.00
47404. Staining Jar, oval form, with cover, 85 x 43 x 19 mm. .30
47408. " same size as No. 47404 but rectangular form. .30
47412. " Block, of wood, for 6 staining jars, including 6 No. 47408 Jars with lids. 2.25
47416. " only, without jars. .50
47420. " Rack, of brass, nickel plated, for the convenient handling of slides and also for immersion in a large vessel of staining fluid. .90

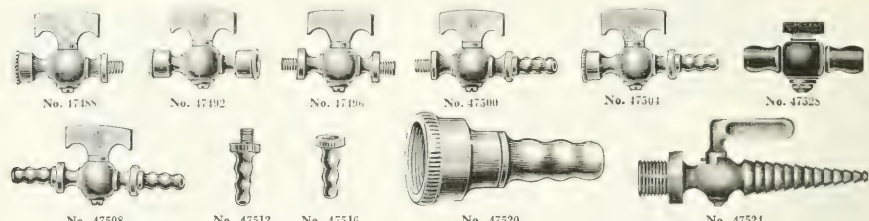




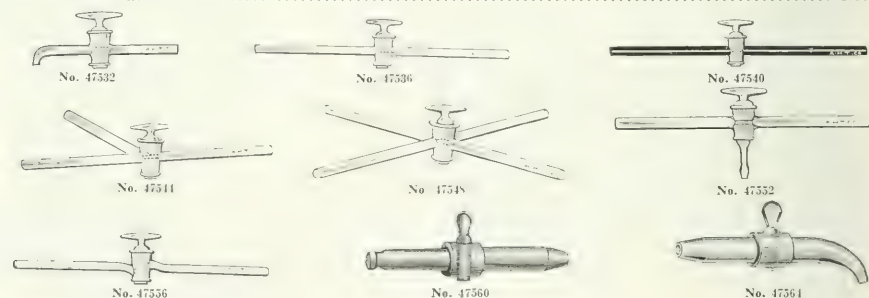
47456. **Stirring Apparatus**, consisting of pulley only with support for glass rods at different distances and rod to clamp to apparatus support. Very convenient in arranging various stirring apparatus. 1.75
47460. **Stirring Apparatus, Schulze**, consisting of pulley with clamp, for single glass rods of various forms. Without clamp or glass stirrer. 2.00
47464. **Stirring Rods**, of glass, for use with above or other stirring apparatus.
- | Style..... | A   | B   | C    | D    | E   |
|------------|-----|-----|------|------|-----|
| Each.....  | .75 | .50 | 1.25 | 1.00 | .60 |
47468. **Stirring Apparatus, Blair**, as used in iron analysis. Complete with stirrers, 6 beakers with covers, asbestos plate, etc., but without motor. 17.00
47472. **Stirring Apparatus**, for hand or power, on wooden base, with iron supports, including stirring rods and beakers.
- |                        |       |       |
|------------------------|-------|-------|
| Number of beakers..... | 6     | 8     |
| Each.....              | 17.50 | 20.00 |
47476. **Stirring Apparatus**, similar to above but for attaching by clamps to an apparatus support, without beakers or support, as shown in illustration.
- |                        |      |       |
|------------------------|------|-------|
| Number of beakers..... | 4    | 6     |
| Each.....              | 8.00 | 10.25 |
47480. **Stirring Apparatus, Fischer**, including Rabes water turbine, adjustable clamp, pulley, support, glass rod with vanes and glass jar. 12.00



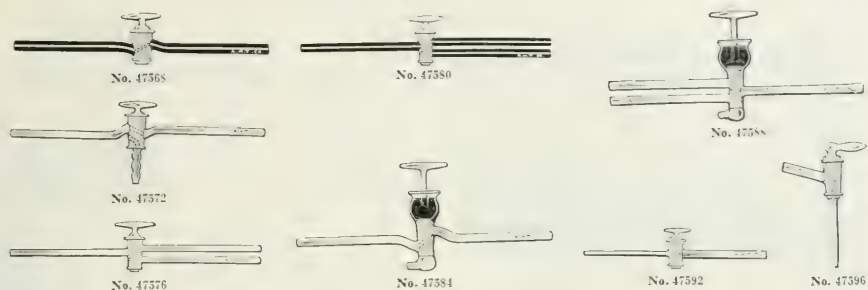
47484. **Stirring Apparatus, Electric**, consisting of motor which can be furnished for either alternating or direct current, 110 or 220 volts, adjustable arm for holding the stirring rod and rheostat for regulating speed from 50 to 1000 r. p. m. Please specify voltage and current in ordering.. 25.00



47488. **Stopcock, Brass**, specially made for laboratory purposes, guaranteed oil and air tight, with both male and female thread. Bore, inches.....  $\frac{1}{8}$   $\frac{1}{4}$
- Each..... .50 .65
47492. **Stopcock**, as above with both ends having female thread..... .50 .65
47496. " " " " " male..... .50 .65
47500. " " " " " one end for tubing and the other with male thread..... .50 .65
47504. " " " " " female..... .50 .65
47508. " " " " " both ends for tubing..... .50 .65
47512. **Connectors, Brass**, for making hose connections to above stopcocks, with male thread. Bore, inches.....  $\frac{1}{8}$   $\frac{1}{4}$
- Each..... .15 .15
47516. **Connectors**, as above, for stopcocks, with female thread..... .15 .15
47520. " " " " " hydrant..... .30
47524. **Stopcock, Brass, nickel plated**, with long spout for gas connections; very convenient for laboratory connections as the tubulation for tubing is  $2\frac{1}{2}$  inches long tapering from  $\frac{1}{4}$  inch at the small end to  $\frac{1}{2}$  inch at the large end; provided with 12 indentations so that it may be safely used with tubing from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch bore..... .60
47528. **Stopcock, Hard Rubber**, for acids,  $H_2S$ , etc.,  $\frac{1}{4}$  inch bore, with tubulations for rubber connections at both ends..... 1.00



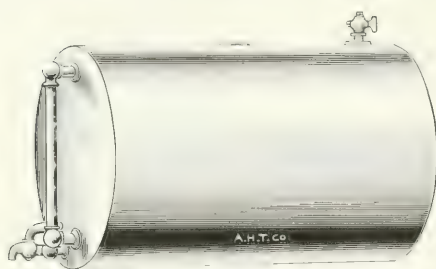
47532. **Stopcock, Glass, lampblown form**, with curved outlet. Bore, mm..... 2 3 4
- Each..... .90 1.15 1.35
47536. **Stopcock, Glass**, as above, but straight. Bore, mm..... 1 2 3 4 5 6 8 10
- Each..... .75 .90 1.10 1.35 1.60 2.00 3.00 5.00
47540. **Stopcock, Glass, lampblown form, straight**, but with the inlet and outlet of capillary tubing of 1 mm bore and an outside diameter of from 6 to 7 mm..... 1.00
47544. **Stopcock, Glass, lampblown form, three-way**. Bore, mm..... 2 4
- Each..... 1.25 1.50
47548. **Stopcock, Glass**, as above, four-way. Bore, mm..... 2 4
- Each..... 1.50 1.75
47552. **Stopcock, Glass**, as above, three-way, with downward outlet at end of stopper. Bore, mm..... 2 4
- Each..... 1.25 1.75
47556. **Stopcock, Glass**, as above, two-way, with plug bored at an angle, 2 mm bore..... 1.10
47560. **Stopcocks, Glass, heavy molded form, straight**. Bore, mm..... 4 6 8
- Each..... 1.10 1.25 1.50
47564. **Stopcocks, Glass, heavy molded form, curved**. Bore, mm..... 4 6 8
- Each..... 1.10 1.25 1.50



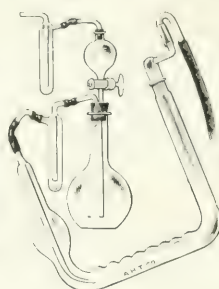
47568.	Stopcock, Glass, with capillary tubing with 1 mm bore.	1.40
47572.	Stopcock, Glass, three-way, with downward outlet at end of stopper. Bore, mm.	4
	Each	1.50 2.25
47576.	Stopcock, Glass, with stopper with two oblique holes and two outlets on one side. Bore, mm	4
	Each	1.50 2.40
47580.	Stopcock, Glass, same as No. 47576 but with capillary tubing of 1 mm bore	1.75
47584.	Glass, two way, with plug bored at an angle and with mercury seal. Bore, mm	4
	Each	2.35 3.00
47588.	Glass, same as above but three way with two outlets on one side.	
	Bore, mm.	2 4
	Each	3.00 4.00
47592.	Stopcock, Glass, straight, light weight for making burette tips, etc.; with inlet tube of 4 mm bore and outlet tube of 2 mm bore	.75
47596.	Stopcock, Glass, angle form, for burette tips, etc.; with inlet tube of 5 mm bore and outlet tube of 2 mm bore	.90
47600.	Grease, suitable for use with above stopcocks, Per stick.	.25



47604.	Stopclock, Center Seconds, a convenient substitute for the stopwatch for timing laboratory experiments; furnished with an indicator hand to show the point of starting.	7.50
47608.	Stopwatch, ordinary quality, similar in appearance to No. 47612; as used in timing various laboratory experiments, particularly measurements of viscosity, etc., reading in 1/4 seconds	6.50
47612.	Stopwatch, Jaquet, Anti-Magnetic, absolutely guaranteed. In solid nickel case; recommended as a thoroughly satisfactory watch for laboratory purposes.	12.00
47616.	Stopwatch, Jaquet, Anti-Magnetic, with double second hand. By the first pressure both second hands are released. At the second pressure the first second hand stops while the other second hand continues until the third pressure. At the fourth pressure both hands return to zero.	20.00
47620.	Storage Tanks, of acid-proof stoneware, widely used for distilled water, acids, etc., in laboratories. With symbol lettered on front; with ground in stoneware stopcock but without wooden support shown in illustration.	
	Capacity in gallons.	6 1/2 13 26 1/2 39 1/2
	Each.	10.50 18.00 26.00 40.00



No. 47624



No. 47636



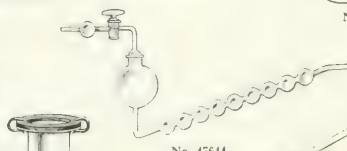
No. 47628



No. 47632



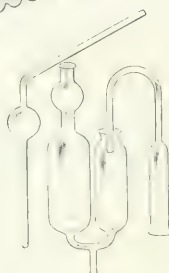
No. 47620



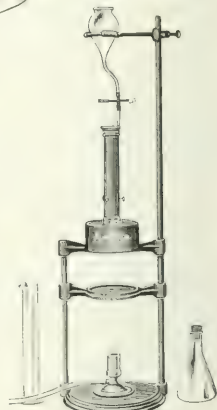
No. 47644



No. 47648



No. 47660



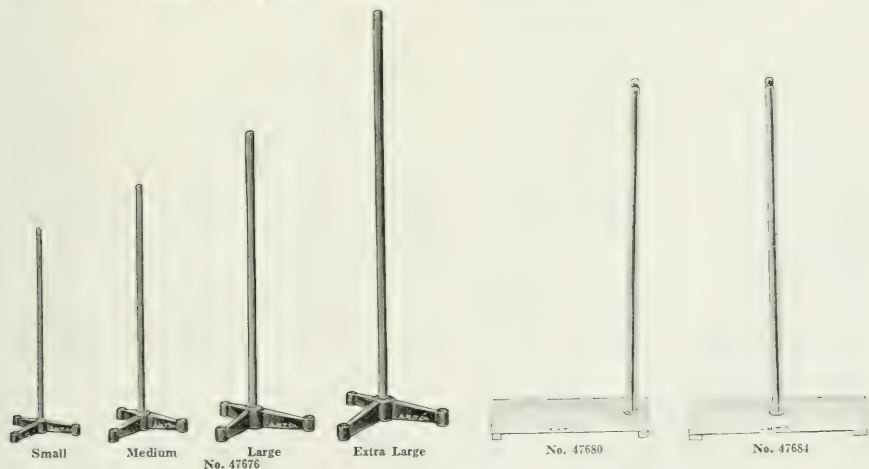
No. 47664

47624. **Storage Tanks**, for distilled water, of tin lined copper. These tanks are of stout construction of 16 oz. cold rolled copper, tin lined throughout, are cylindrical in shape, with a cover at top and tin lined faucet at bottom and with water gauge at the side. The 100 gallon size is reinforced with a heavy iron band around the middle.
- |                        |       |       |       |
|------------------------|-------|-------|-------|
| Capacity, gallons..... | 25    | 50    | 100   |
| Each.....              | 35.00 | 40.00 | 50.00 |
47628. **Straw Rings**, plaited, for use as supports for flasks, dishes, beakers, etc.
- |                          |     |     |     |     |     |     |
|--------------------------|-----|-----|-----|-----|-----|-----|
| Inside diameter, mm..... | 50  | 75  | 100 | 125 | 150 | 200 |
| Each.....                | .15 | .18 | .20 | .25 | .30 | .40 |
47632. **Suberite Rings**, for supporting flasks, dishes, etc. These are superior to straw rings commonly used for this purpose, being neater and more durable.
- |                           |     |     |     |     |     |     |
|---------------------------|-----|-----|-----|-----|-----|-----|
| Inside, diameter, mm..... | 30  | 60  | 90  | 120 | 150 | 180 |
| Each.....                 | .25 | .35 | .45 | .55 | .65 | .75 |
47636. **Sulphur Apparatus, Dudley**, improved form, as used at the present time in the Pennsylvania Railroad laboratories and which eliminates the complicated and delicate bromine holder. Glass parts only..... 12.00
47640. **Sulphur Apparatus, Meyer**, for the determination of carbon in iron and steel by the use of barium hydrate, and the determination of sulphur by the aid of bromine; without stopcock.
- |                      |      |      |
|----------------------|------|------|
| Number of bulbs..... | 6    | 10   |
| Each.....            | 1.25 | 1.50 |
47644. **Sulphur Apparatus, Meyer**, for the determination of sulphur in iron and steel by the bromine method; with stopcock.
- |                      |      |      |
|----------------------|------|------|
| Number of bulbs..... | 6    | 10   |
| Each.....            | 2.50 | 2.75 |
47648. **Sulphur Apparatus, Wiborgh**, for the exact colorimetric determination of sulphur in iron. Glass parts, with ring and clamp..... 6.00
47652. **Standard Color Scale**, with percentage table..... 10.00
47656. **Prepared linen discs** treated with cadmium, for use with the above. Per 100..... 4.00
47660. **Sulphur Apparatus**, as used in oil refining, consisting of three glass parts with wooden base.... 1.75
47664. **Sulphur Photometer, Parr**, for indicating the percentage of sulphur in coal, coke, petroleum, etc., by making use of a fused mass secured as a by-product in combustions with the Parr Calorimeter. The mass is dissolved in water precipitated with barium chloride and the density of the precipitate estimated by reading the depth of the liquid in the graduated tube at which the light from the flame disappears, which reading shows the percentage of sulphur..... 35.00

## SUPPORTS

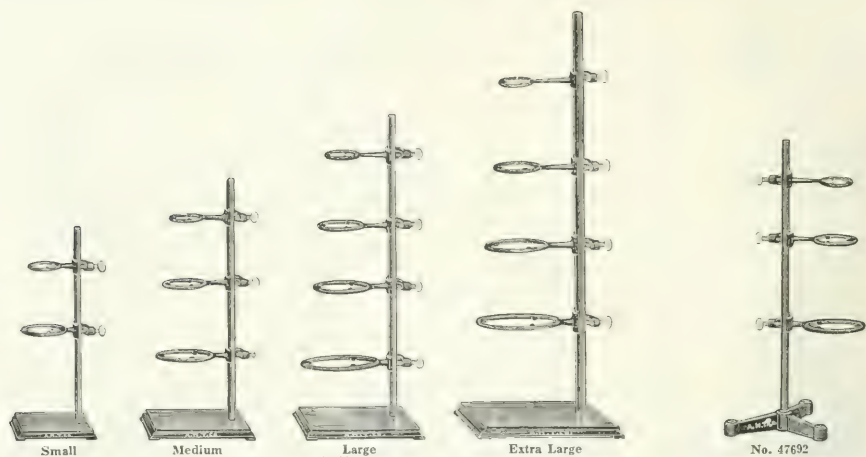


47668. Supports, without Fittings, with rectangular base, of japanned cast iron with copper plated rod.
- | Size.....                    | Small         | Medium        | Large         | Extra Large   |
|------------------------------|---------------|---------------|---------------|---------------|
| Size of base, inches.....    | 4 x 6         | 5 x 8         | 5½ x 9        | 6 x 11        |
| Height of rod, inches.....   | 18            | 20            | 24            | 36            |
| Diameter of rod, inches..... | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ |
| Each.....                    | .30           | .40           | .60           | 1.00          |
47672. Support, without Fittings, with rectangular base of japanned cast iron 5 x 8 inches with rod in center, 20 inches high by ½ inch in diameter..... .50

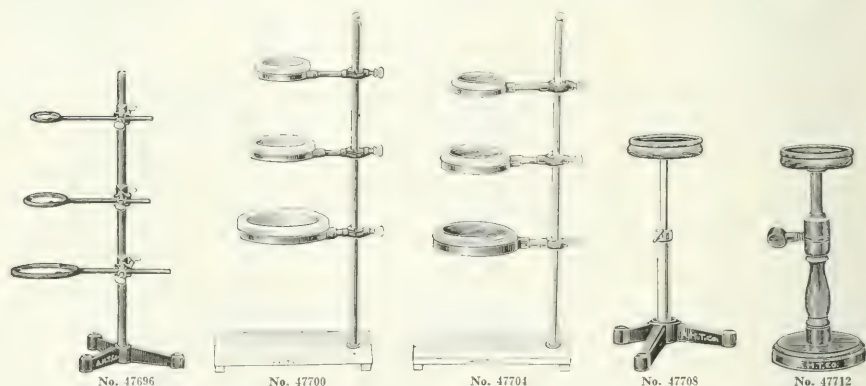


47676. Supports, without Fittings, with tripod base, of japanned cast iron with copper plated rod.
- | Size.....                    | Small         | Medium        | Large         | Extra Large   |
|------------------------------|---------------|---------------|---------------|---------------|
| Height of rod, inches.....   | 18            | 20            | 26            | 36            |
| Diameter of rod, inches..... | $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{1}{2}$ |
| Each.....                    | .30           | .45           | .65           | 1.00          |
47680. Support, without Fittings, with solid glazed porcelain base 6½ x 8½ inches, with rod of polished brass, 18 inches high..... 4.00
47684. Support, without Fittings, with solid glazed porcelain base 14 x 5½ inches with brass rod in center, 24 inches high..... 5.00





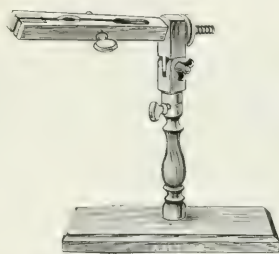
47688. Supports, with Rings, consisting of Supports No. 47668 with rectangular base with No. 46072 Rings.
- | Size            | Small | Medium | Large | Extra Large |
|-----------------|-------|--------|-------|-------------|
| Number of rings | 2     | 3      | 4     | 4           |
| Each            | .50   | .75    | 1.00  | 1.50        |
47692. Supports, with Rings, consisting of Supports No. 47676 with tripod base with No. 46072 Rings.
- | Size            | Small | Medium | Large | Extra Large |
|-----------------|-------|--------|-------|-------------|
| Number of rings | 2     | 3      | 4     | 4           |
| Each            | .50   | .80    | 1.05  | 1.50        |



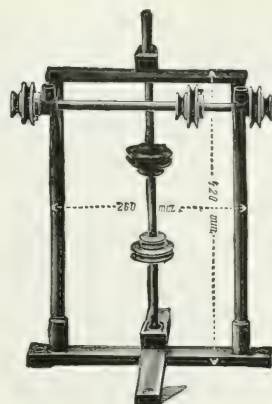
47696. Support, with Rings, consisting of No. 47676 with tripod base, medium size; three extension rings No. 46076, 3 1/2 inches outside diameter, and three clamp holders No. 24518 large size..... 1.60
47700. Support, with Rings, consisting of No. 47680 with rectangular porcelain base with three brass rings with porcelain inset and screw clamp, No. 46080, 80 mm diameter..... 5.50
47704. Support, with Rings, consisting of No. 47680 with rectangular porcelain base with three brass rings with wooden inset and screw clamp, No. 46084, 80 mm diameter..... 5.50
47708. Support Tables, with iron tripod, brass rod and wooden top, adjustable as to height.
- |                          | 200  | 300  | 400  |
|--------------------------|------|------|------|
| Height extended, mm..... | 200  | 300  | 400  |
| Diameter of top, mm..... | 70   | 90   | 125  |
| Height closed, mm.....   | 120  | 190  | 240  |
| Each.....                | 1.50 | 1.75 | 2.00 |
47712. Support Tables, of polished wood, adjustable as to height, same sizes as No. 47708.
- |                          | 200 | 300  | 400  |
|--------------------------|-----|------|------|
| Height extended, mm..... | 200 | 300  | 400  |
| Each.....                | .80 | 1.00 | 1.25 |



No. 47716



No. 47724



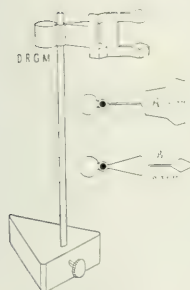
No. 47728



No. 47720



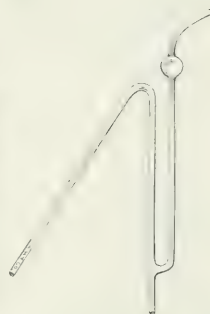
No. 47736



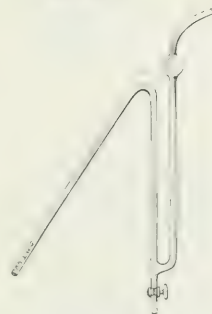
No. 47732



No. 47740

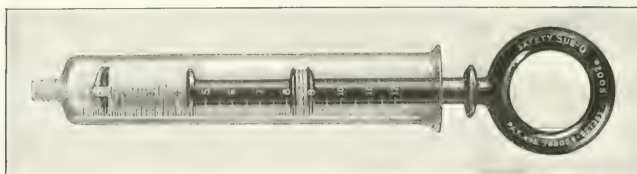


No. 47744



No. 47748

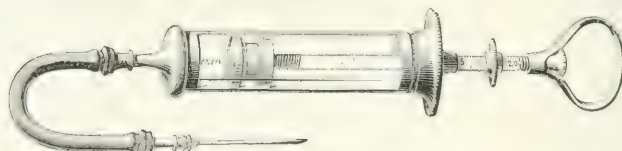
47716.	Support Table, of cast iron, with clamp for fastening to upright of apparatus support, 5 inches in diameter.....						.40
47720.	Support, Schellbach, of hardwood.....						2.00
47724.	Support, Gay-Lussac, of wood, adjustable in all directions.....						2.00
47728.	Support, Transmission, with horizontal and vertical shaft and two fixed and three adjustable pulleys. Very convenient in transmitting power from water, hot air, electric or other motors to stirring devices, etc., in the laboratory; 37 cm high by 18 cm wide.....						9.00
47732.	Support, on triangular base, with one clamp No. 24678, particularly suited for conductivity vessels, calomel normal electrodes, etc.....						1.50
47736.	Swimming Cups, Amberg, of porcelain, with perforations, for washing specimens; with cork stopper which floats the cup in the washing fluid.						
	Height, mm.....					35	55
	Diameter, mm.....					26	36
	Each.....					.50	.65
47740.	Syphons, of glass, plain form.						
	Length, mm.....	200	300	375	500	750	1000
	Each.....	.25	.25	.30	.40	.75	1.00
47744.	Syphons, of glass, with suction tube.						
	Length, mm.....	200	300	375	500	750	1000
	Each.....	.35	.40	.50	.65	1.00	1.30
47748.	Syphons, of glass, with suction tube and glass stopcock.						
	Length, mm.....		300	375	500	750	1000
	Each.....		1.50	1.75	2.25	2.50	3.00



No. 47756

47756. **Syringe, Sub-Q Safety**, for bacteriological and serological work. A very satisfactory glass syringe at low price. With a piston of black glass and safety device preventing the loosening of the asbestos packing and the larger sizes have ring handle. The needles are attached by screw thread except in the larger sizes which have a flexible coupling. Price includes leather case and two steel needles.

Capacity, cc.....	2	4	6	12	20	50	100
Each.....	1.25	1.50	1.75	2.00	2.50	5.00	7.50
47760. Extra Steel Needles for above. Per dozen.....							2.75



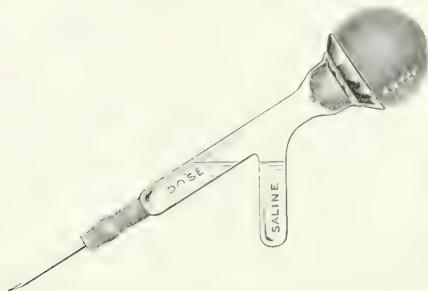
No. 47761

- Syringe, Roux**, for bacteriological and serological work, as used in the Pasteur Institute of Paris; original French make; widely in Pasteur treatment and for tuberculin injections in veterinary practice.

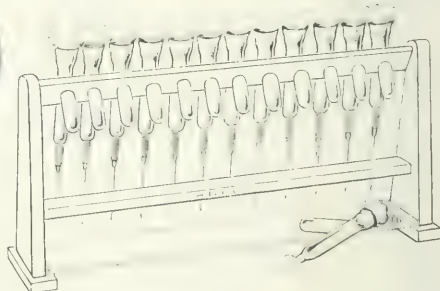
Capacity, cc.....	5	10	20	50	100
47764. Syringe, only, without needles or case.....	2.80	3.60	5.60	8.80	11.20
47765. Syringe in case with two steel needles.....	6.00	7.20	10.00	14.00	20.00
47766. Extra glass barrels.....	.30	.30	.40	.80	1.20
47767. " pistons.....	.20	.20	.20	.40	.60
47768. " rubber washers.....	.10	.10	.10	.20	.30

#### Needles, for Roux Syringes.

Length, mm.....	25	30	40	50
Inside diameter, mm....	.65	.9	.9	.1
47770. Steel, each.....	.60	.60	.60	.70
47772. Platinum iridium, each.....	1.15	2.00	2.25	3.25



Nos. 47776 and 47780



No. 47784

- Syringe, Hitchens, for Injecting of Precise Amounts.** This syringe provides a convenient method of washing out the entire dose from the syringe with a normal salt solution without the removal of bulb or syringe barrel or the assistance of another person. The glass parts are made of Jena alkali-free glass which is practically insoluble even during sterilization with the normal salt solution. See *Journal of Experimental Medicine*, Vol. VIII, No. 5, October 12, 1906.

47776. Syringe Barrel of Jena alkali-free glass, with rubber connection and needle.....	.25
47780. Bulb, only, of red rubber, for injecting.....	.60
47784. Rack, Rosenau, for 12 syringes, with glass shelf at bottom. See Bulletin 19, 1904, U. S. Public Health and Marine Hospital Service.....	.50



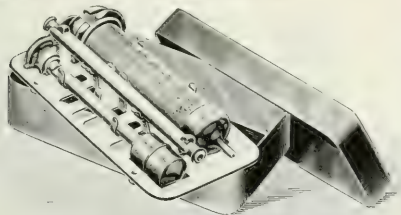
No. 47788—1 cc in



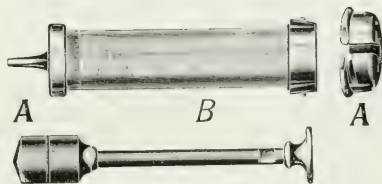
No. 47788—1/2 cc in



No. 47801



No. 47792



No. 47788—5 cc in

**SYRINGE, RECORD, ORIGINAL MAKE.** Not to be confused with many imitations now on the market; with improved conical plunger to expel the last drop. When glass barrels are broken, customers are requested to return to us all the metal parts of the syringe, whereupon we will send a complete new syringe at the prices indicated under the heading "Repair Exchange" in the price list below. This is necessary because each barrel must have its piston individually ground in and because of the difficulty in the use of the special solder used in joining the glass to the metal in these syringes.

	Capacity, cc.....	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{5}{12}$	10	20
	Graduated in, cc.....	$\frac{1}{100}$	$\frac{1}{30}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$	1	2
47788.	Record Syringe, only, without case or needles.....	2.50	2.50	2.10	2.60	3.80	4.40	4.80
47792.	Record Syringe, in metal case with two steel needles.....	3.00	3.00	2.60	3.20	4.60	5.60	7.20
47796.	Record Syringe, in metal case with two platinum-iridium needles.....	3.65	3.65	3.40	5.00	8.00	9.25	10.80
	Repair Exchange.....	1.60	1.60	1.40	1.80	2.00	2.40	2.80
	Sizes of needles regularly furnished.....	2 H 20's	H 16 & H 20	2 H 16's	H 1 & 12	S 1 & 4	S 1 & 4	S 1 & 4
47801.	Set of 5 Record Syringes, 1 cc, 2 cc, 5 cc, 10 cc and 20 cc, in metal case, with 20 steel needles.....	25.00						

#### Directions for Sterilizing Syringes of the Record Type.

Detach piston from barrel before sterilization. Put syringe into cold water and light lamp of sterilizer. After sterilization let syringes become cold before placing them into the cold disinfectant. Do not use any other sterilizers but those with perforated trays. Record syringes should not be sterilized in any other way than by boiling them in water.

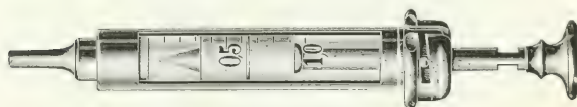




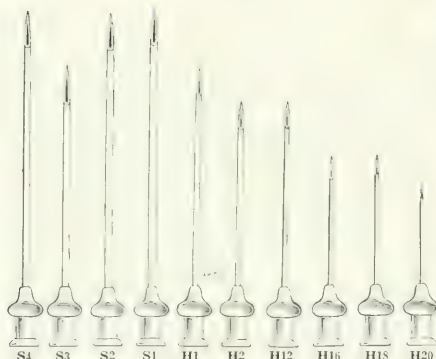
No. 47808

**SYRINGE, RECORD-BRUNEAU.** Construction the same as the regular Record Syringe, with the exception of the removable cap which is made long enough to retain the piston during sterilization, etc., thus obviating the necessity of complete withdrawal. This improvement effects a great saving in time and breakage and insures certainty of aseptic conditions. When glass barrels are broken, customers are requested to return to us all the metal parts of the Syringe, whereupon we will send a complete new Syringe at the prices indicated under the heading "Repair Exchange," in the price list below. This is necessary because each barrel must have its piston individually ground in and because of the difficulty in the use of the special solder used in joining the glass to the metal in these syringes.

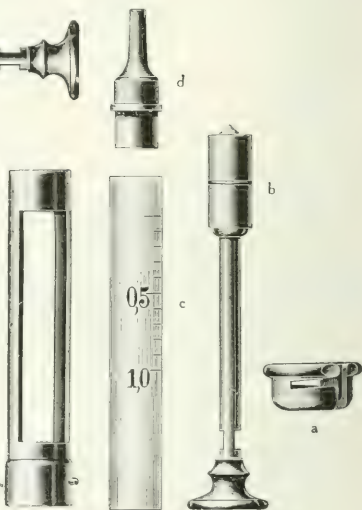
Capacity, cc.....	1	2	5	10	20
47808. Syringe, only, without case or needles.....	2.50	3.15	4.30	5.10	5.75
47812. Syringe in metal case with two steel needles.....	3.00	3.60	5.00	6.20	7.40
47816. Syringe " " " " " platinum-iridium needles.....	5.00	6.00	8.50	10.60	13.80
Repair Exchange.....	1.40	1.80	2.20	2.40	2.80
Sizes of needles regularly furnished.....	2 H 16's	H 1 & 12	S 1 & 4	S 1 & 4	S 1 & 4



No. 47821 Assembled



Nos. 47840 and 47844



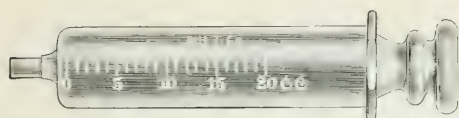
No. 47824 with parts dismounted

**SYRINGE, REFORM.** The distinctive feature of this syringe is the entire absence of metallic solder of any kind. The glass barrels are ground to fit the metal parts and the syringe may be dismantled for cleaning, or the replacement of the glass barrel and immediately reassembled. As each glass barrel is individually ground to its accompanying piston, it is necessary in ordering new glass barrels to order a piston fitted to each. These are kept in stock as per price list below and glass barrel with fitted piston may be used with any Reform syringe of the same capacity.

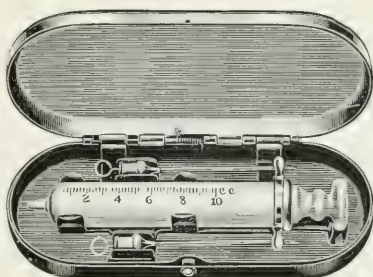
Capacity, cc.....	1	2	5	10	20
47824. Syringe, only without case or needles.....	2.40	2.85	4.40	5.20	6.20
47828. Syringe, in metal case with two steel needles.....	3.20	3.80	5.60	6.60	8.00
47832. Syringe, " " " " " platinum-iridium needles.....	5.25	6.20	9.00	11.00	14.40
47836. Glass Barrel with piston ground in to fit.....	1.40	1.80	2.20	3.20	4.00
Sizes of needles regularly furnished.....	2 H 16's	H 1 & 12	S 1 & 4	S 1 & 4	S 1 & 4

**NEEDLES, FOR THE RECORD, RECORD-BRUNEAU AND REFORM SYRINGES.** The letter "S" refers to the needles from the serum group of sizes and "H" refers to the regular hypodermic series. Prices of platinum-iridium needles are subject to market fluctuations.

	S1	S2	S3	S4	H1	H2	H12	H16	H18	H20
47840. Steel, Needles each.....	.20	.20	.18	.15	.10	.10	.10	.10	.10	.10
" " " " " per dozen.....	2.25	2.25	1.75	1.75	1.00	1.00	1.00	1.00	1.00	1.00
47844. Platinum-iridium Needles, each.....	3.35	2.75	1.60	1.65	1.40	1.15	1.15	.65	.60	.60



No. 47818 20cc. size



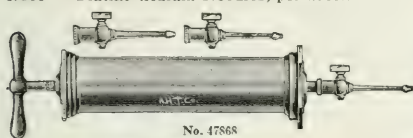
No. 47852



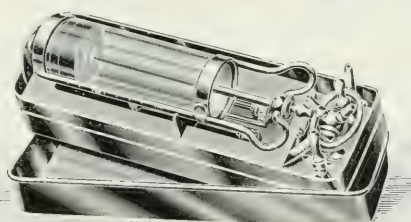
No. 47848 1cc. size

**Syringe, Luer**, for bacteriological and serological work; an all glass, aseptic syringe with slip-on needles, American make. Considered by many to be superior to the original French make.

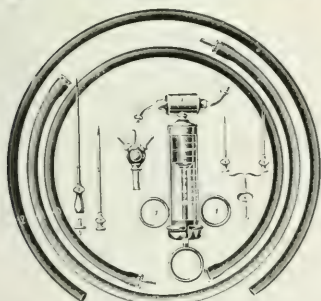
	Capacity, cc.....	1	5	10	20
	Graduated in, cc.....	1	$\frac{1}{2}$	$\frac{1}{2}$	1
47848.	Luer Syringe, only, without needles or metal case.....	1.75	2.25	3.00	4.50
47852.	Luer Syringe, with metal case and two steel needles.....	2.75	3.50	4.50	6.00
47856.	Luer Syringe, with metal case and two platino-iridium needles.....	3.75	6.00	7.00	8.50
	Needles, only, for Luer Syringes. American make.				
	Size.....	22 G	20 G	20 to 22 G	
	Length, inches.....	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$ to 2	
47860.	Steel Needles, per dozen.....	2.50	2.50	3.00	
47864.	Platino-iridium Needles, per dozen.....	16.00	19.00		



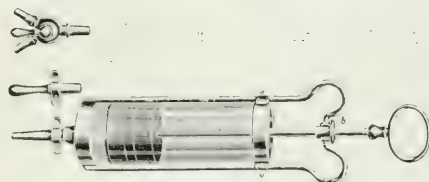
No. 47868



No. 47872

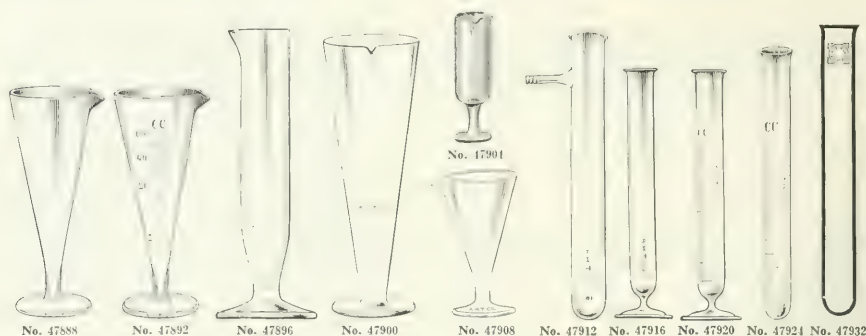


No. 47880

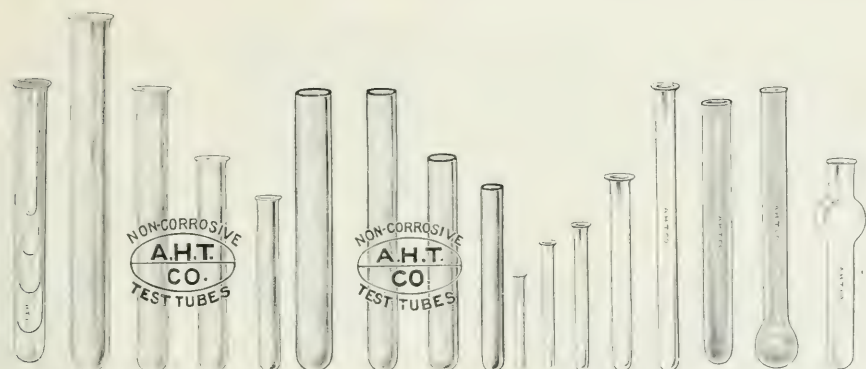


No. 47876

47868. **Syringe**, for injecting in veins and arteries, each with three canulae, with stopcock, nickel plated.  
Capacity, cc..... 50 100 150 200  
Each..... 3.50 8.25 9.50 11.00
47872. **Syringe, or Aspirator, Record**, 100 cc capacity as used by manufacturers of biological products for injecting live bacteria into horses, etc. Complete in case with 3-way cock, 2 connecting tubes with metallic connections for same, 2 long steel canulae, 1 trocar, 1 conical tubulation for direct attachment of the canulae and 1 olive form tubulation..... 21.60
47876. **Syringe**, same as above, with 2 canulae and 3-way cock, but without needles, trocars, tubes or case.  
Capacity, cc..... 50 100  
Each..... 10.00 11.25
47880. **Syringe, Record Universal**, for infusions, injections, punctures and aspiration, consisting of a 10 cc Record Syringe with three finger rings, attachable ventilating head, 3-way cock, needle connection, steel needles for serum and other subcutaneous injections, puncture canula, infusion canula, tubing with metallic connections, long tube for injections in connection with ventilating head. Complete in case..... 14.50
47884. **Syringe, Record Universal**, same as above but without attachable ventilating head, needle connection, needles, tubes or case..... 8.00



47888.	Test Glasses, for collecting sediment, conical form, with foot and spout.								
	Capacity, cc.....	30	50	100	200.	300			
	Each.....	.15	.15	.20	.30	.35			
47892.	Test Glasses, same as above, graduated.								
	Capacity, cc.....	30	50	100	200	300			
	Each.....	.40	.45	.50	.75	1.00			
47896.	Test Glass, cylindrical form, Suydenham Hospital model; height 240 mm, diameter 40 mm, capacity 180 cc; with blunt conical bottom.					.40			
47900.	Test Glass, tall conical form, with blunt bottom, 200 cc capacity, 20 cm high, with spout.					.25			
47904.	Test Glasses, lecture table form, with spout.								
	Capacity, cc.....				125	250			
	Each.....				.25	.40			
47908.	Test Glasses, low wide form with broad flattened bottom instead of point as in No. 47888; convenient for cleaning or for crushing crystals with glass rod; with spout.								
	Capacity, cc.....			50	100	250			
	Each.....			.18	.25	.40			
47912.	Test Tubes, with side neck and lip.								
	Length, mm.....		120	150	180	200			
	Each.....		.05	.06	.10	.12			
47916.	Test Tubes, with lip and foot.								
	Height, mm.....	100	125	150	175	200	250		
	Each.....	.07	.08	.10	.12	.15	.20		
47920.	Test Tubes, graduated, with lip and foot.								
	Capacity, cc.....				5	15	25		
	Graduated in, cc.....				$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{2}$		
	Each.....				.45	.50	.60		
47924.	Test Tubes, graduated, with lip, but without foot.								
	Capacity cc.....	5	10	15	20	25	30		
	Graduated in, cc.....	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{2}$	$\frac{1}{2}$		
	Each.....	.30	.35	.40	.45	.45	.50		
47928.	Test Tubes, Opaque Fused Silica, heavy wall, with lip.								
	Length, inches.....		4	5	5	6	6	7	
	Diameter, inches.....		$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	
	Each.....		.85	1.00	1.20	1.45	1.75	2.25	
47932.	Test Tubes, Thin Wall, of Jena Fiolax Tubing. These tubes are to be identified by a black longitudinal stripe. This glass is easily worked with the blowpipe flame and is not to be confused with the hard or combustion tubing. It is practically alkali free and is recommended for use wherever the greatest insolubility in water, alkalies and acids is desired, as well as great resistance to sudden temperature changes.								
	Length, mm.....	100	120	140	140	160	160	180	200
	Outside diameter, mm.....	14	16	18	20	18	20	22	25
	Each.....	.03	.04	.05	.05	.05	.06	.07	.09
	Per 100.....	2.00	2.80	3.60	4.00	3.60	4.40	5.60	7.20
47936.	Test Tubes, Thick Wall, of Jena Combustion Tubing, containing very little alkali and fairly tractable in the blowpipe flame, although as hard to fuse as the best Bohemian potash tubing.								
	Length, mm.....	100	120	140	160	180	200		
	Outside diameter, mm.....	12	15	18	20	22	25		
	Each.....	.05	.07	.09	.11	.14	.18		
	Per 100.....	4.00	5.60	7.20	8.80	11.20	14.40		



No. 47940 No. 47941 No. 47948 No. 47952 No. 47956 No. 47960 No. 47964

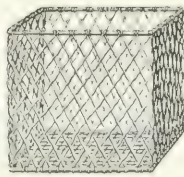
**NOTE:**—We do not carry in stock test tubes made of commercial glass tubing because of the crystallization on the surface of this tubing which frequently takes place in laboratory use. The diameters of all test tubes are approximate outside diameters of the tubing. A considerable variation must be allowed for bore in the diameter of the tubing and, in the case of heavy wall test tubes, in the thickness of the wall, because of the unavoidable variation in drawing the tubing. Where test tubes must be furnished of an absolutely uniform diameter and thickness of wall they must be selected from our regular stock and a higher price charged. Prices given per 1000 apply only on orders of at least 1000 or more. All test tubes are neatly packed in cartons of 100 each.

<b>47940. Test Tubes, Thin Wall, With Lip, of good German glass, for chemical work.</b>									
Length, mm.....	100	120	120	120	150	150	150	200	
Outside diameter, mm.....	12	13	15	18	16	18	20	25	
Per 100.....	.65	.85	1.05	1.25	1.25	1.55	1.80	2.50	
Per 1000.....	5.15	6.60	8.40	10.00	10.00	12.35	14.35	31.25	
<b>47944. Test Tubes, "Non-Corrosive," Thin Wall, With Lip, for chemical work. These test tubes are made of a fine resistance glass and are of distinctly superior quality and workmanship, and are guaranteed to be non-corrosive under all ordinary conditions of use. For test tubes of ordinary quality see our No. 47940.</b>									
Length, mm.....	75	100	120	120	120	120	150	150	
Outside diameter, mm.....	11	12	13	15	18	18	20	25	
Per 100.....	.85	1.10	1.30	1.55	1.65	1.65	1.80	2.50	
Per 1000.....	6.80	8.80	10.40	12.40	13.20	13.20	14.40	31.25	
Length, mm.....	150	150	150	200	200	200	250	250	
Outside diameter, mm.....	18	20	25	20	25	25	25	25	
Per 100.....	11.95	2.00	3.60	3.00	4.00	4.00	5.50	5.50	
Per 1000.....	5.60	16.00	28.80	24.00	32.00	32.00	44.00	44.00	
<b>47948. Test Tubes, "Non-Corrosive," Thick Wall, Without Lip, for use as culture tubes in bacteriology. These tubes are guaranteed not to corrode or give off alkali after repeated sterilization in the autoclave at 120°C. They are made of a superior resistance glass of great mechanical strength and will stand an unusual amount of mechanical stress without breaking. They are standard throughout the U. S. and are specified in many important bacteriological laboratories in preference to cheaper tubes. The size 150 x 16 mm is standard for most work.</b>									
Length, mm.....	100	100	120	120	120	150	150	150	
Outside diameter, mm.....	12	15	13	16	18	16	18	20	
Per 100.....	1.75	2.10	2.00	2.40	2.60	2.60	2.85	3.50	
Per 1000.....	13.60	16.80	16.00	19.20	20.80	20.50	22.80	35.00	
<b>47952. Test Tubes, "Non-Corrosive," for Serological Work, of medium weight wall, with flat well formed lip; of resistance glass showing a minimum amount of color and of selected sizes suitable for the purpose above indicated. Length, mm.....</b>									
Outside diameter, mm.....	50	65	65	65	65	75	100	100	150
Per 100.....	4	4	6	10	12	6	10	6	10
Per 1000.....	1.00	1.00	1.00	1.25	1.25	1.10	1.25	1.25	1.40
<b>47956. Test Tubes, of Hardest Bohemian Combustion Tubing, very heavy wall, with slight lip.</b>									
Length, mm.....	100	125	150	200	250	250	250	250	
Diameter, mm.....	16	16	18	25	25	25	25	25	
Each.....	.10	.12	.15	.25	.30	.30	.30	.30	
<b>47960. Test Tubes, of Hardest Bohemian Combustion Tubing, heavy wall, with slight lip and bulb at bottom.</b>									
Length, mm.....	100	120	150	180	200	200	200	200	
Each.....	.15	.18	.20	.25	.35	.35	.35	.35	
<b>47964. Test Tubes, with bulb near top which tends to prevent boiling over of contents and which enables tube to be laid on the table without the contents overflowing. Length, mm.....</b>									
Diameter, mm.....	125	150	150	150	150	150	150	150	
Each.....	.10	.10	.10	.10	.10	.10	.10	.10	

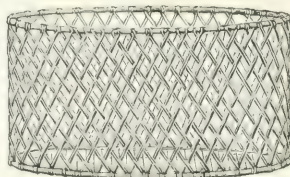




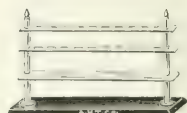
No. 47968



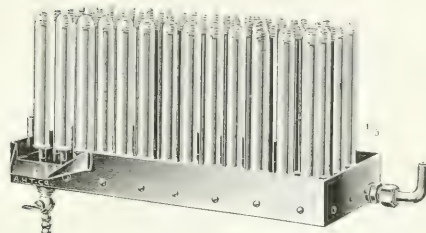
No. 47972



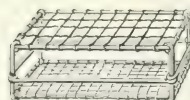
No. 47976



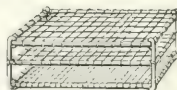
No. 47985



No. 47980



No. 47992

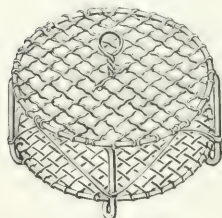


No. 47996

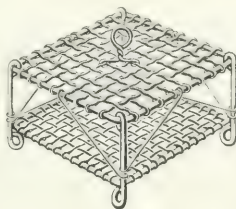


No. 47984

47968. **Test Tube Baskets**, cylindrical, of heavily galvanized wire, for use in incubators and sterilizers; 6 inches high by 5 inches diameter..... .50
47972. **Test Tube Basket**, similar to above but rectangular, 6 x 5 x 4 inches..... .45
47976. " " cylindrical, 10 inches in diameter by 6 inches high; for use in medium size autoclave No. 20936..... 1.50
47980. **Test Tube Cleaner, Neisser**, for the cleaning of test tubes, particularly culture tubes, by means of water and steam; consisting of a rectangular copper box 40 x 16 cm, with 65 rods with springs at the top, to prevent the breaking of the test tubes, and outlet for both steam and water.  
Duty Free..... 27.25      Duty Paid..... 32.75
47984. **Test Tube Filling Attachment**, for measuring out exact quantities of fluid; consists of a separatory funnel with two-way stopcock and graduated side tube. Price does not include support and ring.  
Capacity, cc..... 250      500      1000  
Each..... 2.50      3.00      4.00
47988. **Test Tube Support**, nickel plated on iron base 6 inches high by 11 inches long; for 10 test tubes .... 2.00
47992. " " of tinned wire, for 40 test tubes up to 35 mm diameter..... .50
47996. " " with double shelf, for 90 test tubes of not over 12 mm outside diameter, as used in serological work; entire rack may be immersed in water bath..... 1.00



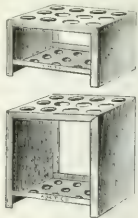
No. 48000



No. 48004

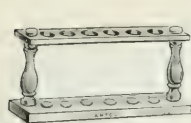


No. 48008

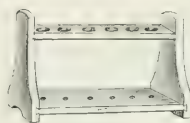


No. 48012

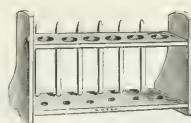
48000. **Test Tube Support**, of tinned wire, circular form, holding 40 test tubes of 18 mm diameter..... .75
48004. " " same as No. 48000 but square form..... .75
48008. **Test Tube Support**, of copper, for use in water baths, incubators, sterilizers, etc.; holes are 23 mm diameter.  
Diameter, inches..... 5      6      8      10  
Number of holes..... 14      24      36      48  
Each..... .75      1.00      1.25      1.75
48012. **Test Tube Support**, of copper with bottom shelf having flange to receive contents of tube in case of breakage; for use in incubators, sterilizers, etc.; with twelve  $\frac{3}{4}$  inch holes.  
Size, inches..... 3 x 4 x 2 $\frac{1}{2}$       3 x 4 x 4 $\frac{1}{2}$   
Each..... 1.00      1.25



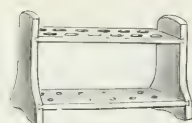
No. 48016



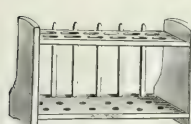
No. 48020



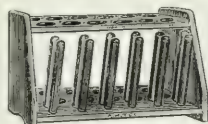
No. 48024



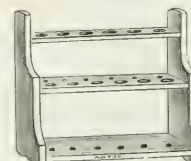
No. 48028



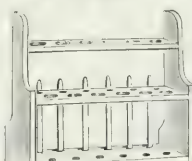
No. 48036



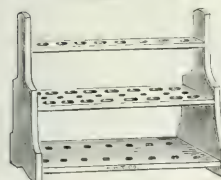
No. 48040



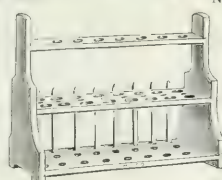
No. 48044



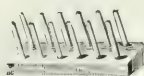
No. 48048



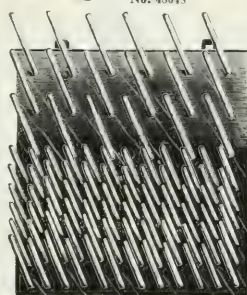
No. 48052



No. 48056



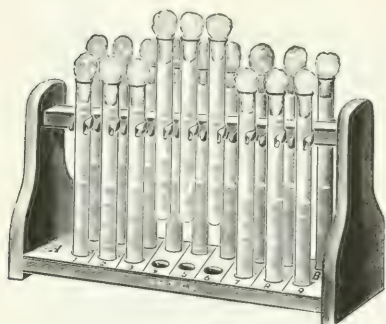
No. 48060



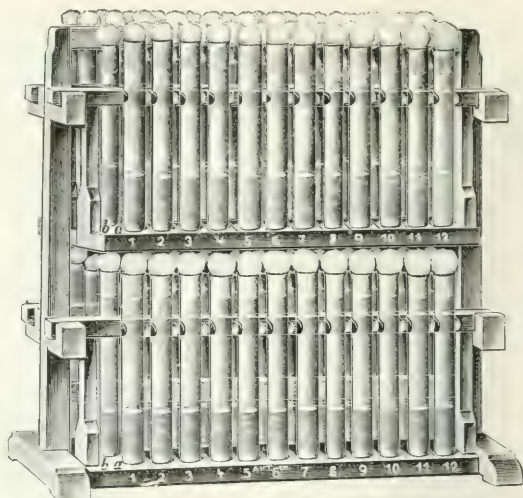
No. 48064

**Note**—Our Test Tube Supports are put together with brass pins, and do not come apart. All holes in the bottom deck are full  $\frac{3}{4}$  inch in diameter and all holes at top are  $\frac{1}{2}$  inch in diameter.

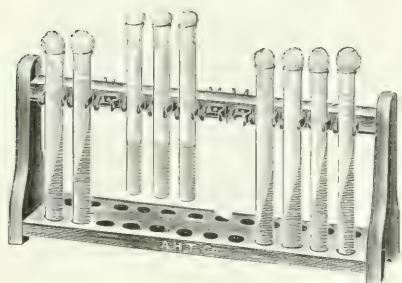
48016.	<b>Test Tube Support</b> , of beechwood, oil finish, single row, on turned wood supports.		
	Number of holes.....	6	12
	Each.....	.20	.25
48020.	<b>Test Tube Support</b> , of beechwood, oil finish, single deck, single row.		
	Number of holes.....	6	12
	Each.....	.25	.30
48024.	<b>Test Tube Support</b> , of beechwood, oil finish, with pins in rear, single row, single deck.		
	Number of holes.....	6	12
	Each.....	.30	.45
48028.	<b>Test Tube Support</b> , of beechwood, oil finish, single deck, double row.		
	Number holes.....	12	24
	Each.....	.30	.45
48036.	<b>Test Tube Support</b> , of beechwood, oil finish, single deck, double row, with pins in rear.		
	Number of holes.....	12	24
	Each.....	.40	.60
48040.	<b>Test Tube Support</b> , of black walnut, oil finish, single deck, double row, with 12 heavy pins in rear and with 12 extra large holes; very heavy construction.		
	Number of holes.....	12	24
	Each.....	.35	.60
48044.	<b>Test Tube Support</b> , of beechwood, oil finish, double deck.		
	Number of holes.....	12	24
	Each.....	.40	.80
48048.	<b>Test Tube Support</b> , of beechwood, oil finish, double deck, with pins in rear.		
	Number of holes.....	12	24
	Each.....	.70	1.00
48052.	<b>Test Tube Support</b> , of beechwood, oil finish, double deck, with two rows on lower deck and one on upper deck. Number of holes.....	12	24
	Each.....	.24	.40
48056.	<b>Test Tube Support</b> , of beechwood, oil finish, double deck, with two rows on lower deck and one on upper deck, with row of pins in rear. Number of tubes.....	.90	1.25
	Each.....	.30	
48060.	<b>Test Tube Support</b> , consisting of block with 12 drying pins.....	2.50	
48064.	“ “ “ for hanging on wall, consisting of board with 18 large and 72 small pins. ....		



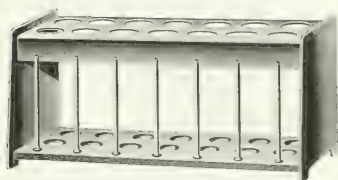
No. 48088



No. 48092



No. 48084



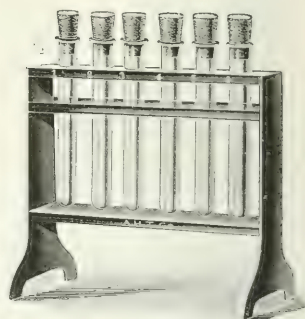
No. 48072



No. 48076



No. 48080

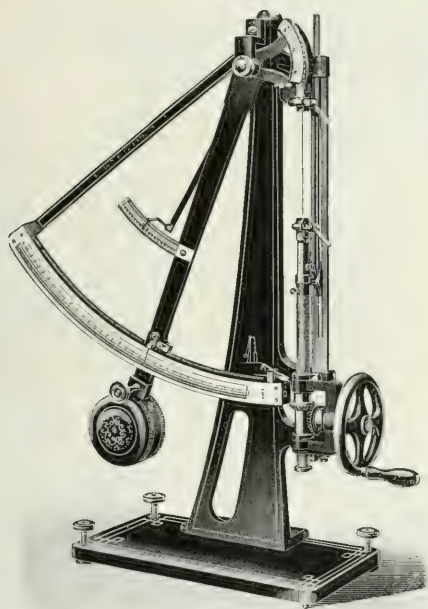


No. 48068

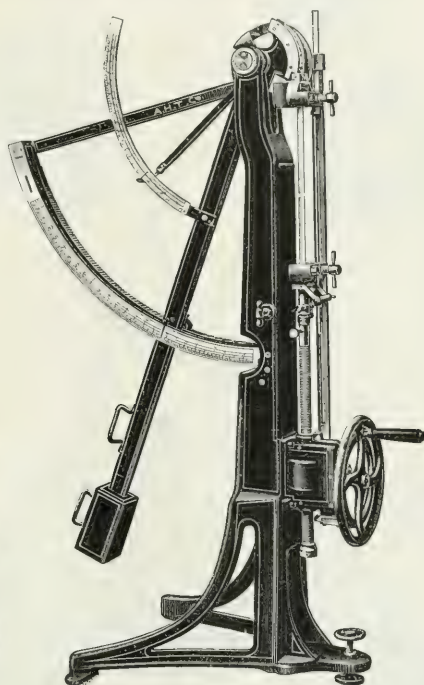
48068. **Test Tube Support, Weidanz**, of copper, for use in serological work; tubes supported so that reaction may be readily observed and each hole stamped with number.  
For, tubes..... 6 10  
Each..... 1.75 3.00
48072. **Test Tube Support**, of stamped steel, black enamelled, with 14 holes of 1 inch diameter and with 7 pins..... .40
48076. **Test Tube Support**, with spring clip; also convenient for use with centrifuge tubes..... .25
48080. " " " " " " with ground glass plate on base for writing..... .80
48084. **Test Tube Support, Woithe**, arranged especially for bacteriological and serological work, permitting the entire contents of the tube to remain in sight. The test tubes are held in place by strong spring clips making it possible to hold them at any height. For 24 test tubes; size of support 32½ cm long, 7½ cm wide and 16 cm high..... 1.00
48088. **Test Tube Support, Woithe**, similar to above but for 18 tubes so arranged that all are visible from either side of the rack, i.e., in alternating series with bottom of racks numbered..... 1.15
48092. **Test Tube Support, Woithe**, similar to above but for 96 tubes and with main support 38½ cm long by 19 cm wide by 37 cm high and with separate support carrying each series of 12 tubes quickly demountable..... 7.50



## TESTING APPARATUS FOR PAPER, YARNS, TEXTILES, RUBBER, LEATHER, ETC.



No. 48096



No. 48104

48096. **Paper Tester, Schopper**, for testing all kinds of paper as to both tearing strength in grams and as to tensile strength in both millimeters and percentage; for strips 15 x 180 mm. Stretching scale reads from 0 to 27 mm and from 0 to 15%. With single scale 0 to 30 kilos in 100 gram divisions.

Style.....	For hand power	With pulley for power driving	With hydraulic motor
Duty Free.....	120.45	174.90	150.15
Duty Paid.....	146.00	212.00	182.00

48100. **Paper Tester**, as above, with double scale, 0 to 5 kilos in 10 gram divisions and 0 to 30 kilos in 100 gram divisions.

Style.....	For hand power	With pulley for power driving	With hydraulic motor
Duty Free.....	127.05	181.50	156.75
Duty Paid.....	154.00	220.00	190.00

48104. **Cloth and Leather Tester, Schopper**, for cloths and woven textiles of all sorts, and for leather, etc. For specimens of from 100 to 400 mm in length and 50 mm in width. With stretch scale reading in both mm and percentage. Operating on the same principle as the paper and yarn testers but specially adapted for the materials above mentioned. As supplied by us to the leather testing laboratories of the U. S. Bureau of Chemistry. With two scales, from 0 to 60 kilos in 1/4 lbs and 0 to 100 kilos in 1/2 kilos.

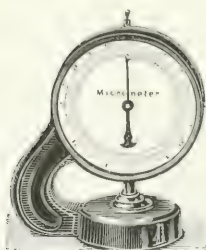
Duty Free.....	270.60	Duty Paid.....	328.00
----------------	--------	----------------	--------

48108. **Cloth and Leather Tester**, as above, with two scales, from 0 to 130 kilos in 1/2 kilos and from 0 to 500 kilos in single kilos.

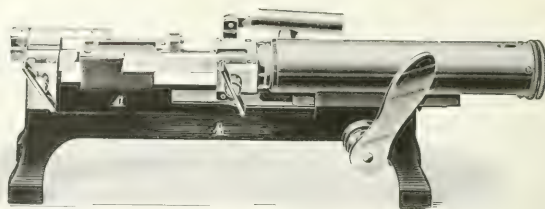
Duty Free.....	363.00	Duty Paid.....	440.00
----------------	--------	----------------	--------

**Note**—Where leather and yarns are to be tested on the same machine a special clamp is provided at small extra expense.

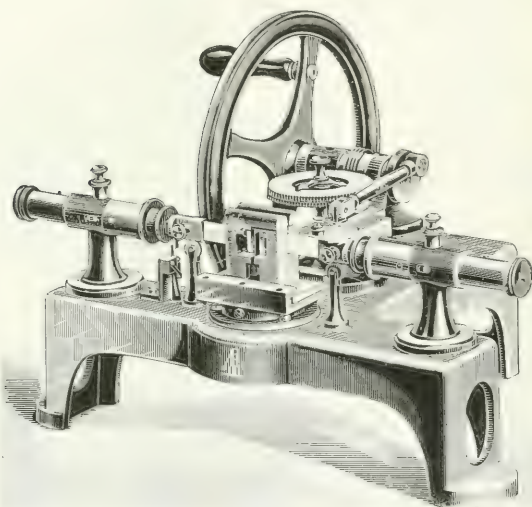




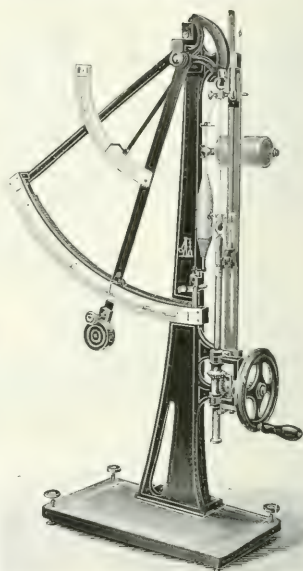
No. 48112



No. 48116



No. 48120



No. 48124

48112. **Thickness Gauge**, for paper testing, automatically reading from 0 to 2 mm in  $\frac{1}{16}$  mm by pointer and in .005 mm by vernier.

Duty Free..... 19.80

Duty Paid..... 24.00

Note—The above Gauges are supplied with dial reading in inches and fractions thereof on special order.

48116. **Paper Tester, Portable, Schopper**, quick acting type, for strips 50 x 10 mm; with stretch scale reading in percentages. By means of a table the reading of the tensile strength scale is converted into kilo values up to 4 kilos, which is sufficient range for papers of ordinary strength. Price includes special strip cutter and a portable carrying case. Determinations can be made within one minute.

Duty Free..... 47.85

Duty Paid..... 58.00

Note—The above machine is furnished for light papers with a capacity of 1.5 kilos and for heavy paper with a capacity of 15 kilos at the same price.

48120. **Folding Test Machine, Schopper**, for determination of the resistance of paper against repeated foldings. Suited for paper of all kinds, i.e., printing, writing, wrapping papers, etc. As furnished by us to various departments of the U. S. Government. For papers weighing up to 150 grams per square meter.

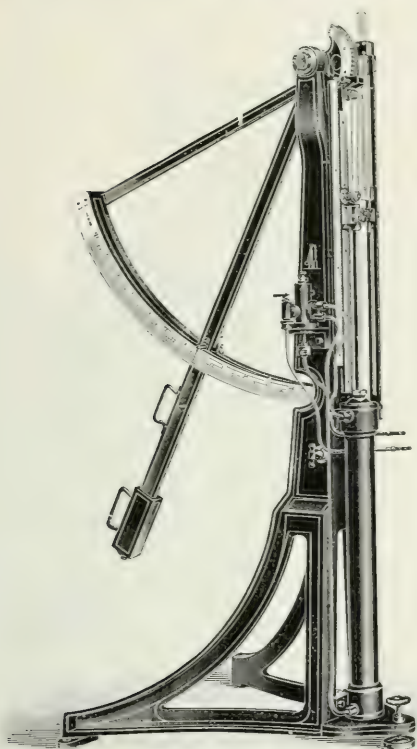
Duty Free..... 165.00

Duty Paid..... 200.00

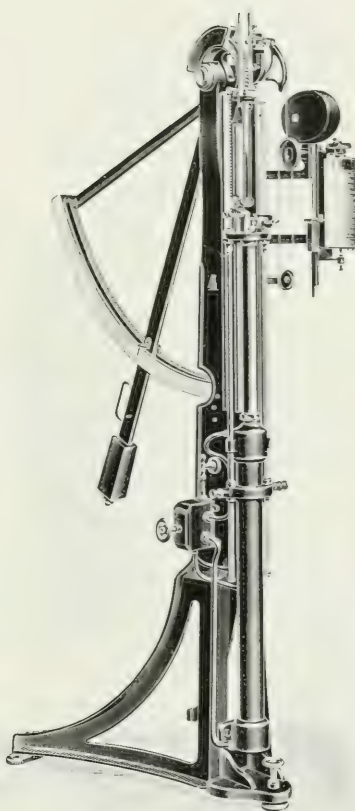
48124. **Yarn Tester, Schopper**, for testing the tensile strength and stretch of yarns, both plain and twisted, and threads of all kinds. With attachment for carrying cops, bobbins and spools and for testing in lengths of 200 mm. The stretching scale reads in both millimeters and percentage.

	5	10	20	30	50	100
With tensile strength scale from 0 to, kilos.....						
Duty Free.....	110.55	115.50	120.45	125.40	148.50	181.50
Duty Paid.....	134.00	140.00	146.00	152.00	180.00	220.00

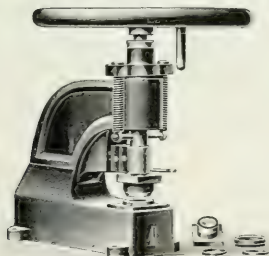
Note—Any of the above machines can be supplied with an additional tensile strength scale of any specified range at \$6.60 duty free and \$8.00 duty paid.



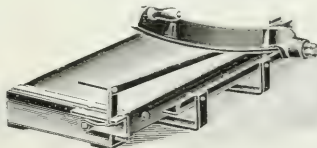
No. 48128



No. 48132



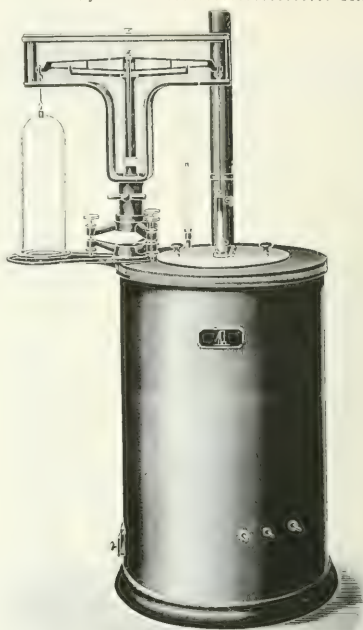
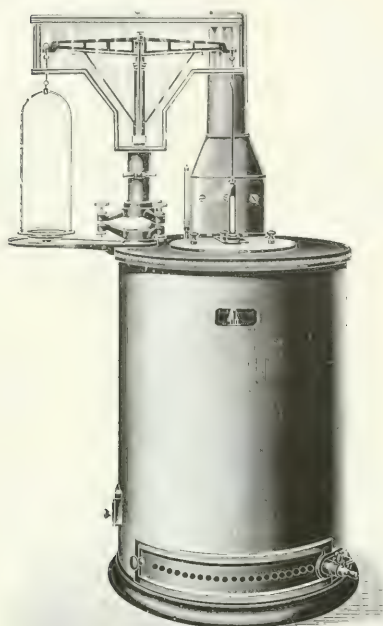
No. 48136



No. 48140

48128. Rubber Testing Machine, Schopper-Dalen-Martens, for testing the elasticity and tensile strength of rubber. The test specimen is of ring shape and is rotated during the experiment, which makes possible the establishment of a numerical expression of the test. The machine is operated by water pressure and requires about 10 lbs. pressure. A recording device for automatically making a diagram of the relation of the load to elongation is provided at extra charge. Strength is indicated in both millimeters and percentage. See "The Influence of the Shape of the Test Body upon the Results of the Strength Test," Communications of the Royal Material Testing Institute of Grosslichterfelde, Vol. 4, 1909. With two scales, 0 to 50 kilos in 100 gram divisions and 0 to 100 kilos in 200 gram divisions.
- |  |        |                |        |
|--|--------|----------------|--------|
| Duty Free.....   | 539.55 | Duty Paid..... | 654.00 |
| 48132. Rubber Testing Machine, as above, but with automatic recording device.            |        |                |        |
| Duty Free.....   | 664.95 | Duty Paid..... | 806.00 |
| 48136. Test Ring Cutter, for making test specimens for above machine, with three knives. |        |                |        |
| Duty Free.....   | 125.40 | Duty Paid..... | 152.00 |

48140. Paper Strip Cutter, for cutting strips for testing of the standard width of 15 mm and for lengths up to 31 cm.  
 Duty Free..... 11 55      Duty Paid..... 14.00

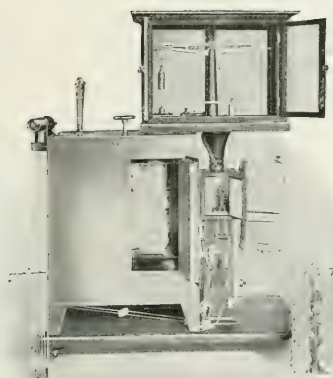


Nos. 48141-60

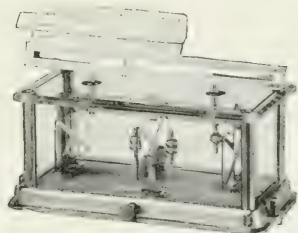
No. 48168

**OVEN, CONDITIONING, SCHOPPER**, for the determination of moisture in silk, wool, cotton, wood pulp, cellulose, rags, etc. The balances may be used separately from the oven or in position on top of the oven, permitting the weighing to be made while the drying process continues, thus avoiding the absorption of moisture due to the removal of the specimen as necessary in older forms. These new models are very quick in operation because of the large amount of warm air supplied. The ovens are provided with chimney to carry off the products of combustion and do not unduly heat up the room in which they are operated. Size I takes about 200 grams of loose material such as unspun cotton or wool and about 500 grams of yarn, or about 1 kilo of cellulose or wet wood pulp. Size II has a capacity for about twice the amounts given for Size I. Gas, steam or electric heating is recommended in all cases where they are possible although the benzene and gasoline oil heaters may be satisfactorily operated where the other sources of heat are unavailable.

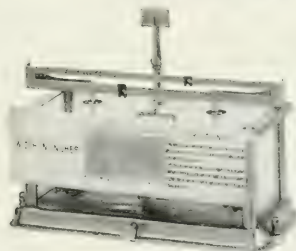
		Size I	Size II
48144.	Conditioning Oven, as above, for gas heating		
	Duty Free.....	132.00	214.50
	Duty Paid.....	160.00	260.00
48148.	Extra for Automatic Temperature Regulator		
	Duty Free.....	23.10	29.70
	Duty Paid.....	28.00	36.00
48152.	Extra for Gas Pressure Manometer		
	Duty Free.....	4.95	4.95
	Duty Paid.....	6.00	6.00
48156.	Conditioning Oven, as above, for benzene heating		
	Duty Free.....	138.60	224.40
	Duty Paid.....	168.00	272.00
48160.	Conditioning Oven, as above, for petroleum heating		
	Duty Free.....	141.90	
	Duty Paid.....	172.00	
48164.	Conditioning Oven, as above, for steam heating		
	Duty Free.....	158.40	247.50
	Duty Paid.....	192.00	300.00
48168.	Conditioning Oven, as above, for electric heating		
	Duty Free.....	191.40	267.30
	Duty Paid.....	232.00	324.00



No. 48172



No. 48176



No. 48180

48172. **Conditioning Oven, Emerson**, for the determination of the moisture content in textile materials, consisting of an electrically heated oven automatically maintained at the proper temperature by a thermostat. Arrangement is made within the oven for supporting four removable wire baskets or containers into which is placed the material to be conditioned. Balances are provided for weighing the material before and after conditioning, the latter weighing being made in the oven. A motor driven fan produces an artificial circulation of heated air through the oven and removes the moist atmosphere, thereby greatly reducing the time for testing. The apparatus is mounted on a wooden base and occupies a floor space of  $2\frac{1}{2} \times 4$  ft., with a total height of about 6 ft. The heating device operates on either alternating or direct current but voltage must be stated in ordering..... 350.00
48176. **Balance, Torsion**, for determining the exact weight in ounces or grams of a running yard or meter of cloth of any width without calculation or the use of weights. A two inch square sample is cut by means of a special die and the scale brought to balance by means of a slide weight. The beam is so graduated that either  $\frac{1}{2}$  oz. or 5 grams can be read..... 35.00  
**Special Die**, to cut 2 inch squares ..... 3.50  
**Mallet**, 2 lbs. in weight, for use with above die..... 1.00
48180. **Balance, Torsion**, for determining the number of yards per pound of fabric of any width without calculation or the use of weights. A three inch square sample is weighed and the position of the weight on the beam indicates the number of yards per pound of sample..... 40.00  
**Special Die**, to cut 3 inch squares ..... 3.50

We maintain a reference catalogue file of over seven hundred manufacturers and dealers in Laboratory Apparatus. Where large equipment lists are in preparation we recommend that customers avail themselves of the opportunity we provide for the convenient and undisturbed consultation of these catalogues before lists are finally prepared for estimates. The use of these catalogues involves no obligation to make purchase of us.



## THERMOMETERS

$$\text{Fahrenheit}^{\circ} = \frac{\text{Centigrade}^{\circ} \times 9}{5} + 32. \quad \text{Centigrade}^{\circ} = \frac{\text{Fahrenheit}^{\circ} - 32 \times 5}{9}$$

Ready Reference Comparison of Centigrade and Fahrenheit Thermometer Scales

Cent.°	Fah.°	Cent.°	Fah.°	Cent.°	Fah.°	Cent.°	Fah.°	Cent.°	Fah.°	Cent.°	Fah.°
-40	-40	7	44.6	38	100.4	69	156.2	99	210.2	245	473
-35	-31	8	46.4	39	102.2	70	158.0	100	212.0	250	482
-30	-22	9	48.2	40	104.0	71	159.8	105	221.0	255	491
-25	-13	10	50.0	41	105.8	72	161.6	110	230.0	260	500
-20	-4.0	11	51.8	42	107.6	73	163.4	115	239.0	265	509
-19	-2.2	12	53.6	43	109.4	74	165.2	120	248.0	270	518
-18	-0.4	13	55.4	44	111.2	75	167.0	125	257.0	275	527
-17	1.4	14	57.2	45	113.0	76	168.8	130	266.0	280	536
-16	3.2	15	59.0	46	114.8	77	170.6	135	275.0	285	545
-15	5.0	16	60.8	47	116.6	78	172.4	140	284.0	290	554
-14	6.8	17	62.6	48	118.4	79	174.2	145	293.0	295	563
-13	8.6	18	64.4	49	120.2	80	176.0	150	302.0	300	572
-12	10.4	19	66.2	50	122.0	81	177.8	155	311.0	310	590
-11	12.2	20	68.0	51	123.8	82	179.6	160	320	320	608
-10	14.0	21	69.8	52	125.6	83	181.4	165	329	330	626
-9	15.8	22	71.6	53	127.4	84	183.2	170	338	340	644
-8	17.6	23	73.4	54	129.2	85	185.0	175	347	350	662
-7	19.4	24	75.2	55	131.0	86	186.8	180	356	360	680
-6	21.2	25	77.0	56	132.8	87	188.6	185	365	370	698
-5	23.0	26	78.8	57	134.6	88	190.4	190	374	380	716
-4	24.8	27	80.6	58	136.4	89	192.2	195	383	390	734
-3	26.6	28	82.4	59	138.2	90	194.0	200	392	400	752
-2	28.4	29	84.2	60	140.0	91	195.8	205	401	420	788
-1	30.2	30	86.0	61	141.8	92	197.6	210	410	440	824
0	32.0	31	87.8	62	143.6	93	199.4	215	419	460	860
1	33.8	32	89.6	63	145.4	94	201.2	220	428	480	896
2	35.6	33	91.4	64	147.2	95	203.0	225	437	500	932
3	37.4	34	93.2	65	149.0	96	204.8	230	446	520	968
4	39.2	35	95.0	66	150.8	97	206.6	235	455	540	1004
5	41.0	36	96.8	67	152.6	98	208.4	240	464	560	1040
6	42.8	37	98.6	68	154.4						



Nos. 48200 to 48208

48200. Thermometers, with enclosed paper scale, with either Centigrade or Fahrenheit scales, as indicated; outside diameter 9 to 10 mm.  
 Range..... 100° C. 150° C. 200° C. 250° C. 300° C. 212° F. 300° F. 400° F. 600° F.  
 Length, mm..... 300 300 350 350 350 300 300 350 400  
 Each..... .50 .60 .65 .75 .90 .50 .60 .75 .90
48204. Thermometers, with enclosed paper scale, with both Centigrade and Fahrenheit scales, outside diameter 9 to 10 mm.  
 Range, Centigrade..... 100° C. 150° C. 200° C. 360° C.  
 " Fahrenheit..... 212° F. 300° F. 400° F. 600° F.  
 Length, mm..... 300 300 350 400  
 Each..... .80 .90 1.00 1.25
48208. Thermometers, with enclosed paper scale, short form, with both Centigrade and Fahrenheit scales; outside diameter 7 mm.  
 Range, Centigrade..... -10° to +100° C. 100° to 220° C.  
 " Fahrenheit..... +14° to +212° F. 212° to 450° F.  
 Length, mm..... 100 120  
 Each..... .75 1.00



Nos. 48212 to 48216

48212. Thermometers, with enclosed opal glass scale, with capillary of Jena glass; with either Centigrade or Fahrenheit scales, as indicated; outside diameter from 9 to 10 mm.  
 Range..... 100° C. 150° C. 200° C. 360° C. 212° F. 300° F. 400° F. 600° F.  
 Length, mm..... 300 300 350 400 300 300 350 350  
 Each..... 1.10 1.20 1.40 1.80 1.10 1.20 1.40 1.80
48216. Thermometers, with enclosed opal glass scale and capillary of Jena glass; with both Centigrade and Fahrenheit scales; outside diameter 9 to 10 mm.  
 Range, Centigrade..... 100° C. 150° C. 200° C. 360° C.  
 " Fahrenheit..... 212° F. 300° F. 400° F. 600° F.  
 Length, mm..... 290 300 360 390  
 Each..... 1.35 1.50 1.75 2.00

Nos. 48220 to 48221

48220. **Thermometers**, engraved on stem, with opal glass background and safety reservoir at top of capillary; diameter 6 mm; with either Centigrade or Fahrenheit scales as indicated. A widely used laboratory thermometer.

Range	100° C.	150° C.	200° C.	350° C.	212° F.	300° F.	400° F.	600° F.
Length, mm.	300	300	350	400	300	300	350	400
Each	1.00	1.10	1.25	1.50	1.00	1.10	1.25	1.50

48224. **Thermometer**, engraved on stem, with opal glass background and safety reservoir at top of capillary, diameter 6 mm; with both Centigrade and Fahrenheit scales.

Range, Centigrade	100° C.	150° C.	200° C.	350° C.
" Fahrenheit	212° F.	300° F.	400° F.	600° F.
Length, mm.	300	300	350	400
Each	1.25	1.50	1.75	2.00

48226. **Thermometers**, A. H. T. Co. Special, engraved on stem, with safety reservoir at top of capillary, of Jena 16 III glass; recommended for laboratory work generally where accuracy is required but where the expense of a precision thermometer is not justified.

Range, Centigrade	0-50°	0-50°	0-100°	0-100°	100-200°	0-200°	100-200°
Graduated to	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Length, mm.	330	380	400	600	500	600	600
Each	3.00	3.25	3.25	4.00	3.50	4.25	5.00

48228. **Thermometer**, Precision, etched on stem, with white background, of Jena 16 III glass. Those reading over 250° C. are filled with nitrogen. In the higher ranges the glass used is the Jena Borosilicate 59 IV.

Range	-10 to +100° C.	-10 to +100° C.	-10 to +100° C.	-10 to +100° C.	-10 to +250° C.
Graduated in	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each, without certificate	2.75	3.50	5.00	9.00	2.75
Each, with P. T. R. certificate	3.65	4.40	7.25	11.50	5.75
Range	-10 to +250° C.	-5 to +360° C.	-5 to +360° C.	-5 to +500° C.	-5 to +550° C.
Graduated in	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each, without certificate	4.50	5.00	6.50	7.50	9.00
Each, with P. T. R. certificate	7.50	7.25	8.75	10.85	13.45

48232. **Thermometers**, Normal, with enclosed glass scale, constructed in exact accordance with Paragraph 12 of the regulations of the Physikalisch-Technische Reichsanstalt; capillary is of Jena Normal glass. Thermometers reading from 250° to 400° C. are filled with nitrogen and those reading from above 400° C. to 550° C. with nitrogen at a pressure of 20 atmospheres.

Range	-10 to +100° C.	-10 to +100° C.	-10 to +100° C.	-10 to +100° C.	-5 to +200° C.
Graduated in	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each, without certificate	4.50	7.00	10.00	15.00	6.00
Each, with P. T. R. certificate	5.40	7.90	12.25	17.50	8.50
Range	-5 to +200° C.	-5 to +200° C.	-5 to +360° C.	-5 to +360° C.	-5 to +360° C.
Graduated in	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
Each without certificate	7.50	11.75	9.00	12.00	
Each, with P. T. R. certificate	10.00	15.15	11.25	14.25	

48236. **Thermometers**, Normal, same as above but etched on stem and with zero point indicated.

Range	+180 to +550° C.	+100 to 550° C.
Graduated in	$\frac{1}{10}$	$\frac{1}{10}$
Each, without certificate	11.00	13.50
Each, with P. T. R. certificate	15.45	17.95

**Note**—The above Normal Thermometers are the most accurate thermometers made for scientific work and are only surpassed by the Primary Standard Thermometers of the few European makers qualified for such work and which are used in research and are not intended for general laboratory use. These we import from such makers on special order only.

No. 48228

No. 48232

48244. Thermometers, engraved on stem, with white background and safety reservoir at top of capillary; nitrogen filled, for high temperature work; with Fahrenheit scale.

Range.....	212° to 750° F.	212° to 1000° F.
Graduated in.....	2°	5°
Length, mm.....	400	450
Each.....	6.00	8.00



No. 48244

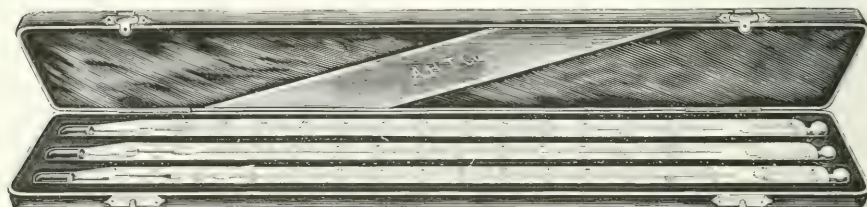
48248. Thermometers, of Quartz Glass, with opal glass scale. These thermometers have the important advantage over all other thermometers that they do not crack by the application of either sudden heat or cold; such a thermometer, for instance, can be plunged directly into molten metal without any danger of its cracking. The temperature readings of a Quartz Glass thermometer, even when used for years, remain always constant because of the extraordinarily low expansion coefficient of quartz glass. These thermometers are about 6 mm in diameter and are graduated in single degrees.

Range.....	-10 to +400° C.	+100 to +400° C.	+100 to +450° C.
Length, cm.....	20	16	20
Each.....	18.00	18.00	20.00

48252. Thermometers, of Quartz Glass, with scale engraved on nickel-steel tube and filled with nitrogen above the mercury at a pressure of 50 atmospheres; range from +300° to +750° C. in 5° divisions.

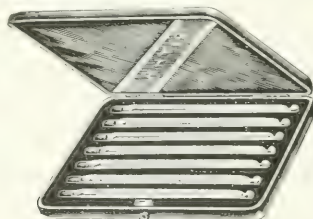
Duty Free..... 28.50 Duty Paid..... 45.00

48256. Protecting Tube of steel, for above  
Duty Free..... 2.25 Duty Paid..... 3.00



No. 48260

48260. Thermometers, Normal, Allihn, with enclosed glass scale, in set of three with ranges of -15 to +100° C., +100° to +200° C. and +200° to +300° C. The thermometers are each about 30 cm long and about 8 mm in diameter, with zero and boiling point correction. In leather case without certificate..... 24.00  
With P. T. R. certificate..... 32.50



No. 48268

48264. Thermometers, Normal, Anschütz, with enclosed glass scale and small bulbs, as used for fractional distillations. Thermometers No. 2 to No. 7, inclusive are nitrogen filled, and all the thermometers of the series are 16 cm long and about 6 mm in diameter.

Number.....	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Range.....	-10 to	+40 to	90 to	150 to	200 to	250 to	300 to
	+60° C.	+100° C.	160° C.	220° C.	270° C.	310° C.	360° C.
Graduated in.....	1°	1°	1°	1°	1°	1°	1°
Each.....	4.50	4.50	4.50	4.50	6.00	6.00	6.00

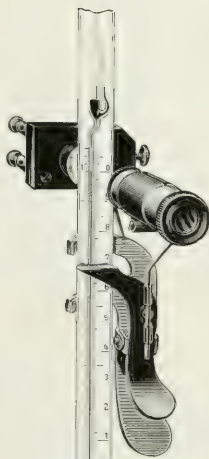
48268. Thermometers, Normal, Anschütz. Complete set of seven as above described, in leather case, 32.50

Note—Anschütz Thermometers as above are supplied with certificate of the Physikalisch-Technische Reichsanstalt on special import order.

48272. Thermometers, for Low Temperatures, etched on stem; as used in liquid air and similar work. The thermometer reading to  $-100^{\circ}\text{C}$ . is filled with toluol and that reading to  $-200^{\circ}\text{C}$ . with pentane; graduated in single degrees.  
 Range.....  $+30^{\circ}$  to  $-100^{\circ}\text{C}$ .  $+30^{\circ}$  to  $-200^{\circ}\text{C}$ .  
 Each..... 5.00 9.00



No. 48286



No. 48276



Fig. 1.

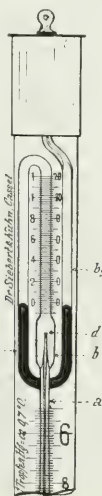


Fig. 2.



Fig. 3.

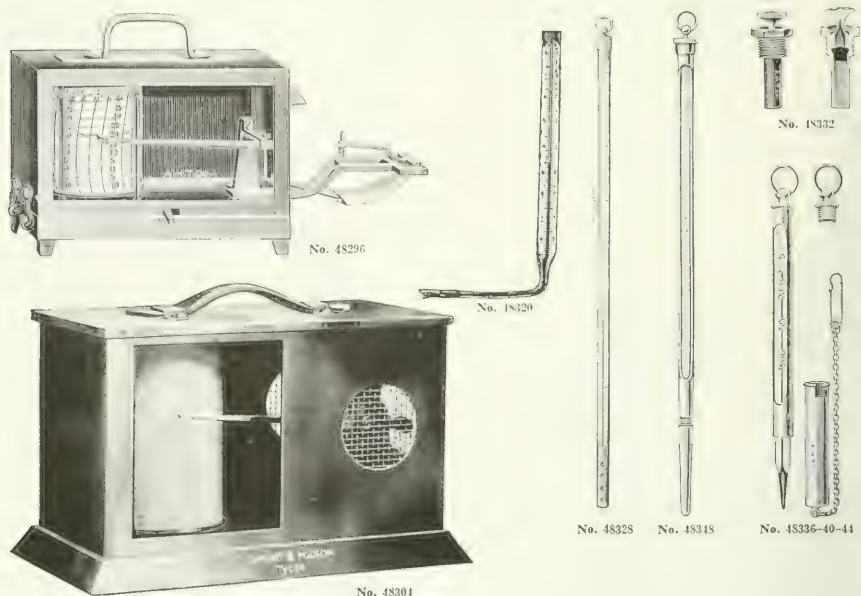
No. 48292

48276. Reading Device for Beckmann Thermometer, with 2 volt incandescent lamp for reading in a dark room..... 3.50  
 48280. Reading Device, as above, without incandescent lamp..... 2.00  
 48284. Thermometer, Beckmann, with total range of about  $5^{\circ}\text{C}$ . divided in  $\frac{1}{100}^{\circ}$ , with capillary held in place by glass wool; without auxiliary scale. Regularly furnished with scale reading from  $0$  to  $5^{\circ}\text{C}$ . as convenient for calorimetric use. This thermometer is of good German make of reasonable accuracy but is not regularly furnished with certificate..... 7.50  
 48288. Thermometer, Beckmann, Goetze make, with scale held in place by glass sealing, with auxiliary scale with range from  $-10$  to  $120^{\circ}\text{C}$ . in  $2^{\circ}$  divisions under reservoir; for use by either boiling point or freezing point method; range  $5^{\circ}$  to  $6^{\circ}\text{C}$ . divided in  $\frac{1}{100}^{\circ}$ ; highly recommended and widely used in calorimetry. Without certificate..... 15.00  
 With P. T. R. certificate..... 25.00

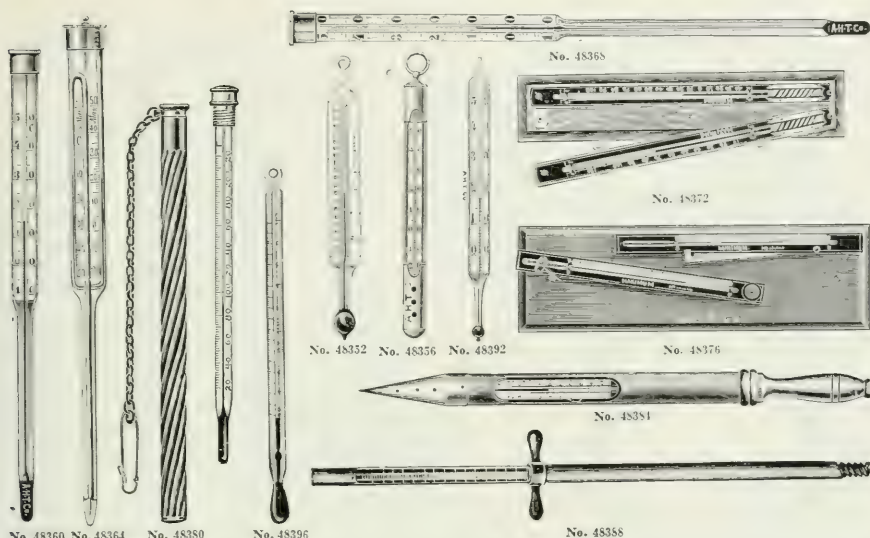
No. 48288

48292. Thermometer, Beckmann, similar to No. 48288 as to range, accuracy, etc., but with improved patent adjustment of auxiliary scale by means of mercury drops instead of by tapping. This is accomplished by the introduction of a short capillary in the lower part of the reservoir, the point of which is adjusted for delivering drops of mercury each equivalent to a definite range of the thermometer scale, which information is engraved on the scale of each thermometer as, for instance, 1 drop =  $1.5^{\circ}\text{C}$ . This arrangement prevents the dropping down of the mercury when an upward movement is necessary, and superfluous mercury may be transferred to the two arms at the side of the reservoir by simply inclining the thermometer. When a reservoir has become filled during transportation it will empty itself automatically if the thermometer is held perpendicularly. In other reservoir arrangements this is frequently prevented by the small particles of air which are often present in thermometers of best make. In this new arrangement such air particles are caught and held below the inlet in the reservoir. This arrangement makes possible very exact setting, greater durability and less risk of breakage in transportation and obviates the continuous tapping down of the mercury column as heretofore practiced. See *Chemiker-Zeitung*, 1912, Nr. 88, S. 843. Without certificate..... 18.00  
 With P. T. R. certificate..... 28.00

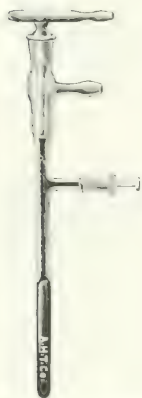




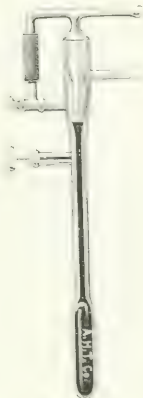
48296. **Thermometer, Recording (Thermograph) Richard.** The thermometer consists of a copper tube of elliptical cross section, hermetically closed and filled with a volatile liquid. This thermometer is of great sensibility and has wide application in the accurate control of temperature in large incubators, incubating rooms, malting rooms, drying rooms, etc. The chart regularly furnished with this thermometer is weekly and the range is from 0 to 50° C. Other scales up to 110° C. or 230° F. are furnished on order and charts may be arranged for hourly, daily or monthly records. The movement of the pen is approximately 1 mm = 1° C. The thermometer is furnished with a wire guard (removed in illustration) to protect same against injury.
- Duty Free..... 24.00      Stock..... 35.00**
48300. **Weekly Charts for above, 0 to 50° C. Per 100..... 2.50**
48304. **Thermometer, Recording (Thermograph) Short & Mason** high drum clock type, with charts for from -62 to +128° F.; with thermometer enclosed; consists of a bimetallic lamina arranged in such manner that there are no levers other than the pen arm. This instrument permits of adjustment to show temperatures covering any 75° F., 150° F., or 300° F. and is furnished with blank charts in addition to the printed charts which by means of the Kew certified thermometer supplied with the instrument enable the range of the instrument to be adjusted to meet special conditions. Price includes certified thermometer..... **40.00**
48308. **Extra Charts, per 100..... 2.50**
48312. **" Pens, each..... .70**
48316. **Special Ink, per bottle..... .75**
48320. **Thermometer, Angle, with vertical tube 30 cm long and 2 cm in diameter and horizontal stem 15 cm long and 1 cm in diameter; graduated in single degrees to 100° C. or 212° F..... 1.50**
48324. **Thermometer, Angle, same as above but with opal glass scale..... 2.00**
48328. **" Armored, engraved on stem with white background. The armor is of seamless steel tubing heavily nickel plated. The thermometers are graduated on a basis of 3 inch immersion.**
- | Range.....          | 0° to 220° F. | +30° to 400° F. | +30° to 600° F. | +30° to 750° F. | +100° to 1000° F. |
|---------------------|---------------|-----------------|-----------------|-----------------|-------------------|
| Graduated in.....   | 2°            | 2°              | 2°              | 2°              | 5°                |
| Length, inches..... | 12            | 14              | 16              | 16              | 16                |
| Each.....           | 4.50          | 5.25            | 6.00            | 7.50            | 10.50             |
48332. **Steel Mercury Wells, for use with above armored thermometers, as used in steam engineering practice. These wells have a very thin steel wall and insure quick transmission of heat. They are provided with close fitting taper plugs to prevent the spilling of mercury in transportation.**
- | Length of stem below thread, inches.. | 1 1/2 | 2    | 3    | 4    | 5    | 6    |
|---------------------------------------|-------|------|------|------|------|------|
| Each.....                             | 1.50  | 1.80 | 2.40 | 3.00 | 3.60 | 4.80 |
48336. **Thermometers, Armored, for asphalt and sand testing. The glass is double the thickness of ordinary glass stem thermometers and the bulb is pointed and so constructed as to reduce liability of breakage to a minimum; 6 inches long, range 100° to 600° F..... 6.00**
48340. **Thermometer, as above, for use in sand testing; range 200° to 750° F..... 7.50**
48344. **" " " for inspector's use, 6 inches long and with a range of 200° to 400° F..... 4.50**
48348. **Thermometer, Armored, for asphalt testing; range from 200° to 450° F in 1°..... 5.00**



No. 48350	No. 48364	No. 48380	No. 48396	No. 48358
48352. Thermometer, Dairy, with enclosed paper scale, 0 to 150° F., length about 8 inches. . . . .	48356. Thermometer, Incubator, short form, for hanging inside the incubating chamber. The thermometer is enclosed in a metal case with perforated outer sheath which turns so as to entirely enclose the thermometer, range from 0 to 50° C. . . . .	48360. Thermometer, Incubator, with very distinct graduations on a white background, so as to be readily seen at a distance; range from 0 to 50° C. with the standard temperature 37½° C. indicated by a red line. Length 250 mm. . . . .	48364. Thermometer, Incubator, self-registering maximum and minimum on Sixe's system; with opal glass scale 160 mm long graduated from -20° to +50° C. The standard temperature 37½° C. is indicated by a red line. The lower part for insertion in the tubulature of the incubator is 200 mm long. Complete with horseshoe magnet for adjusting the indicators. . . . .	48368. Thermometers, Incubator, with enclosed opal glass scale with Jena capillary. The standard temperature 37½° C., at which incubators are ordinarily operated, is indicated by a red line. Range. . . . . 0 to 50° C. 10° to 60° C. Graduated in. . . . . 1 1/2 1/2 1/2 Length, cm. . . . . 45 50 50 Each. . . . . 4.00 5.00
48372. Thermometer, Maximum and Minimum, on oak back, with each tube mounted on a separate plate attached at one end with a thumbscrew so that the thermometers may be reset; range 10° to 40° F. below zero for the maximum tube and 20° to 60° below for the minimum tube, and up to 120° F. above; ordinary quality. . . . .	48376. Thermometer, Maximum and Minimum, standard Weather Bureau pattern, of high quality and with certificate; with engraved stem, magnifying tube, cylindrical bulb, porcelain strip at side of tube on which are marked the figures and every fifth degree line of the scale, oxidized brass plate, insulating brass support with binding screws; board 13 by 5 inches, with mahogany finish. . . . .	48380. Thermometers, Pocket, 5 inches long, mounted in a case similar to clinical thermometers; very convenient for various kinds of field work. Range. . . . . -30 to 120° F. +30 to 220° F. 0 to 50° C. 0 to 100° C. Graduated in. . . . . 2° 2° 1° 1° Each. . . . . 2.25 2.25 2.25 2.25	48384. Thermometer, Soil, mounted in wooden frame with handle and brass pointed ferrule. . . . .	48388. " " in strong metallic case and with scale reading from 0 to 60° C. in 1/10ths and with bore of various lengths depending upon the depth at which temperature is to be read. Length of bore below handle, cm. . . . . 50 100 Each. . . . . 12.50 15.00
48392. Thermometer, Sugar Factory, with enclosed paper scale 0 to 50° F. in 1° divisions, diameter 5/16th inch. . . . .	48396. Thermometer, Veterinary Clinical, with magnifying tube, as used in laboratory practice in taking animal temperatures; in 5 inch hard rubber case; range from 92° to 110° F. in 1/10ths. . . . .	48400. Thermometer, as above, in nickel case with chain and pin similar to 48380. . . . .	48404. Thermometers, Titre Test, for soap and fat laboratories, engraved on stem with magnifying glass and bulbs of Jena Normal glass; graduated in 1/10th divisions. Range. . . . . 0-20° C. 10-30° C. 15-25° C. 20-30° C. 20-40° C. 30-50° C. 40-60° C. Each. . . . . 5.00 5.00 5.00 5.00 5.00 5.00 5.00	



Nos. 48412, 48416 and 48420



No. 48424



No. 48428

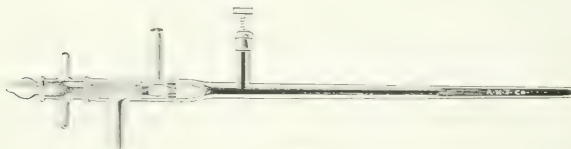


No. 48432



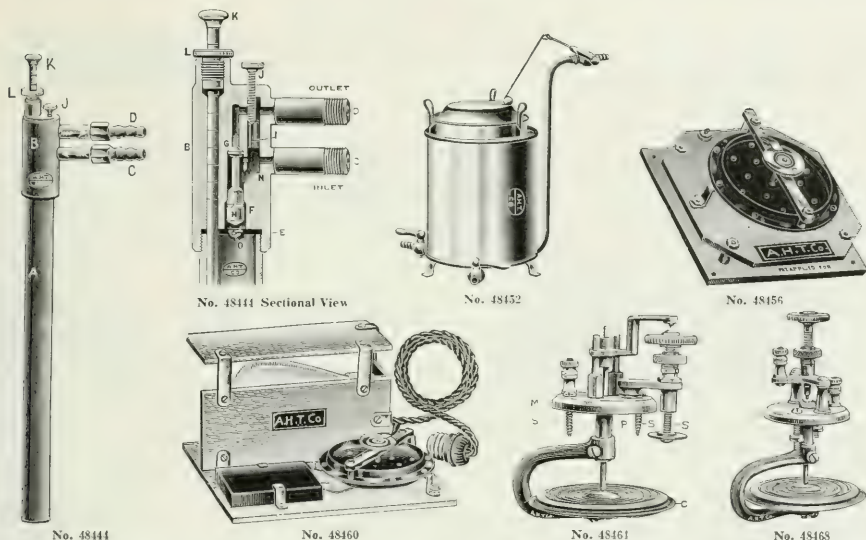
No. 48436

48412. Thermo-regulator, Reichert. This regulator is carefully made and is the most widely used among the several forms constructed of mercury and glass; adjusted for high temperatures. . . . . 2.00
48416. Thermo-regulator, Reichert, same construction as No. 48412 but adjusted for low temperatures. . . . . 2.00
48420. Thermo-regulator, Reichert, same construction as No. 48416 but made shorter for use in paraffine baths. . . . . 2.00
48424. Thermo-regulator, Reichert, improved form, with stopcock to prevent total extinguishing of flame. . . . . 4.00
48428. Thermo-regulator, New Mercury Form, with reservoir tube with thermometer scale and two-way stopcock for adjustment. In setting the regulator the stopcock is set at position "A" and the bulb warmed until the mercury reaches the position "B" at the tip of the glass outlet tube. The stopcock is then turned to position "B" and the mercury column allowed to rise until it reaches the temperature at which the regulator is to operate, when the cock is turned again to position "A" and the thermo-regulator is in adjustment. . . . . 7.50
48432. Thermo-regulator, as above, with electric contact, otherwise operating on the same principle and by the same method as above. . . . . 10.00
48436. Thermo-regulator, Roux Bimetallic. The great advantage of this regulator consists in the entire absence of mercury and glass, the control depending upon the unequal expansion of the different metals composing the metallic couple. It has come into very wide use of recent years and is in many ways the most satisfactory form of thermo-regulator now offered. All of our bimetallic regulators are furnished with an additional brass jacket as shown in illustration. It is recommended that this jacket be inserted in the tubulature of the incubator and the same filled with glycerine, into which the regulator proper is immersed. This prevents the corroding of the bimetallic couple (which occurs in many localities because of the action of the water) and at the same time makes the regulator last longer. . . . . 10 12
- Length, inches. . . . . 7.00 7.50
- Each . . . . .



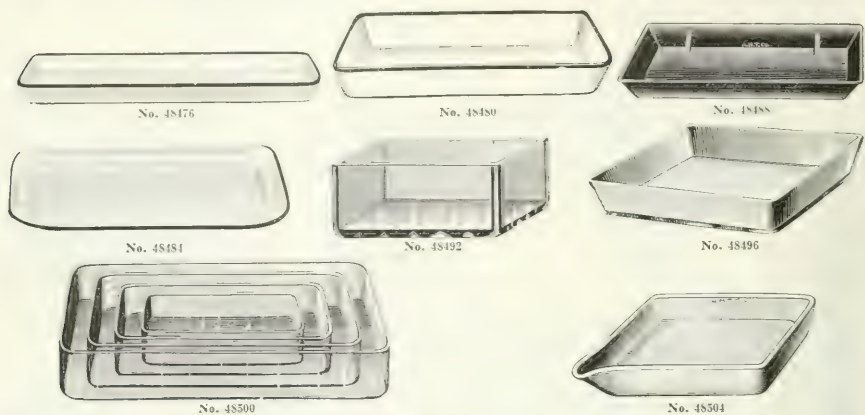
No. 48440

48440. Thermo-regulator, Reichert-Novy. This regulator is based upon the principle of the Reichert Thermo-regulator with modifications. It works equally well for high or low temperatures and is specially recommended for accurate control when used with a gas pressure regulator. . . . . 5.00



48444. **Thermo-regulator, Greenman.** Constructed entirely of steel and recommended as being the most accurate form of mercury regulator. Controls temperature within  $\frac{1}{2}^{\circ}$  regardless of gas pressure or room temperature. For use with this regulator burner No. 22936 is recommended. With brass jacket for glycerine to be inserted in tubulature of incubator. See *Anatomical Record*, Sept., 1908. Without mercury..... 12.50
48448. **Thermo-regulator**, same as No. 48444 but filled with mercury..... 14.50
48452. **Gas Pressure Regulator**, for delivering gas to apparatus at a constant pressure, regardless of the variations of pressure in the house supply. Particularly recommended for use with the Reichert-Novy Gas Regulator No. 48440, with which it is possible to maintain very constant temperatures. Made of copper throughout..... 5.00
48456. **Thermo-regulator, Electric, with Condenser.** Will automatically maintain a constant temperature through a wide range, i. e., between  $30^{\circ}$  and  $80^{\circ}$  C. The diaphragm consists of rubber and metal clamped securely between steel rings. As the expansion of rubber when exposed to heat is greater than that of metal, the diaphragm will move away from the platinum point at the slightest increase in temperature. This breaks the circuit and allows the incubator to cool until the diaphragm again touches the point. By varying the pressure between the adjusting screw and the diaphragm different degrees of heat in the incubator are thus obtained. Contact points are of platinum iridium and the condenser protects these contacts from being destroyed providing the electric current passing through same does not exceed  $\frac{1}{2}$  amperes, i. e., the current from usual incandescent sockets..... 10.00
48460. **Thermo-regulator, Electric, with Incandescent Lamp Heater**, for heating incubators, paraffine baths, etc., not specially built for electric heating and control; consisting of thermo-regulator similar to above, with an incandescent lamp mounted on same board, with cord and plug for attachment to any lamp socket. It is usually sufficient to place same on the bottom of the incubator or oven and run the connecting cord through the horizontal hole found at the side of most incubators. The space required by the entire equipment is  $8 \times 8 \times 4\frac{1}{2}$  inches..... 12.50
48464. **Thermo-regulator, Electric**, expanding capsule type, "Break" form, for use alone with any electrical heating medium which does not require more than 3 or 4 amperes. May be used on either 110 or 220 volt circuits either alternating or direct and for temperatures from  $15^{\circ}$  to  $160^{\circ}$  C. The range of each capsule is about  $20^{\circ}$  in the lower temperatures and nearly  $100^{\circ}$  in high temperatures. The capsule "C" must be within the heated chamber and the post "P" may be made longer or shorter depending upon the length of the tubulation into which post must be inserted, i. e., tubulation from the outside of the utensil through the air jacket, water jacket, etc., to the inner chamber. The screws "S" need not be used as in many utensils it is sufficient to allow the metallic cap "M" to rest on the top of the tubulation or of the incubator. Very satisfactory on incubators, ovens, water and oil baths, whether disc heaters, resistance coils or lamps are used for the heating medium. In ordering please state whether current is alternating or direct, range of temperature desired, size of chamber, and thickness and material of the walls of same for length of post "P"; and whether thermo-regulator is to be placed in a vertical or horizontal position, vertical being preferable. With instructions for wiring, and connections..... 7.00
48465. **Extra Expansion Capsules**..... 1.00
48468. **Thermo-regulator, Electric**, expanding capsule type, similar in operation to No. 48464 but known as the "Make" form and for currents up to 8 or 10 amperes. Must be used with circuit breaker as a relay which indirectly interrupts the heating current. This is furnished with a circuit breaker consisting of a solenoid wound with a heavy wire and with large platinum iridium contacts..... 21.00





48472. Tiles, Earthenware, glazed on one side only; very convenient for supplying either a black or white background.  
Color..... Black White  
Each..... .30 .25
48476. Tray, Aseptic Enamel Ware, of seamless steel, white enamelled, both acid and fire proof; convenient for dissecting instruments, size 12 x 3½ x 1½ inches. .90
48480. Trays, Aseptic Enamel Ware, of seamless steel, white enamelled, both acid and fire proof; deep form.  
Size, inches..... 10½ x 6½ x 2½ 15 x 9 x 2½  
Each..... 1.00 2.00
48484. Trays, Aseptic Enamel Ware, of seamless steel, white enamelled, both acid and fire proof; shallow form; very convenient in the laboratory for dissections on small animals.  
Size, inches..... 12 x 9 16 x 12 20 x 15  
Each..... .80 1.50 2.35
48488. Tray, Dissecting, of heavily tinned metal, japanned, with metal loops on the corners to which the limbs of animals are tied during dissection. Melted wax may be conveniently run into these pans in the laboratory if wax bottom is desired. Size 11 x 9 x 1½ inches .25
48492. Trays, Glass, with vertical sides and polished edges.  
Length, mm..... 100 115 120  
Width, mm..... 40 50 60  
Height, mm..... 40 50 35  
Each..... .50 .60 .70
48496. Trays, Glass, with slanting sides and polished edges; much superior to ordinary photographic trays.  
Length, mm..... 160 210 260  
Width, mm..... 130 160 210  
Each..... .90 1.25 2.00
48500. Trays, Glass, with vertical sides and polished edges.  
Length, mm..... 200 265 350 350  
Width, mm..... 100 165 170 220  
Height, mm..... 45 50 50 60  
Each..... 1.00 2.00 2.50 3.00
48504. Trays, Sanitäts Porcelain, deep form, with spout.  
Length, mm..... 155 255 290  
Width, mm..... 125 195 240  
Each..... .75 2.50 3.00



No. 48508

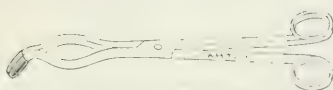


No. 48516

48508. Tongs, Crucible, of polished brass, single bent.  
Length, mm..... 200 250  
Each..... .50 .80
48512. Tongs, Crucible, of nickel plated brass, single bent.  
Length, mm..... 200 250  
Each..... .60 .90
48516. Tongs, Crucible, of steel with black oxidized finish, double bent, 200 mm long; recommended for students' use..... .25



No. 48518



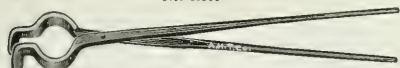
No. 48540 with Platinum Shoes



No. 48544



No. 48548



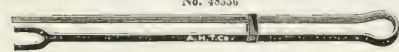
No. 48532



No. 48536



No. 48560



No. 48564

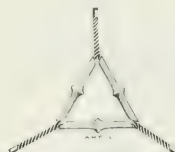
48518.	Tongs, Crucible, of polished brass, double bent.			
	Length, mm	200	250	300
	Each	.55	.90	1.20
48520.	Tongs, Crucible, of nickel plated brass, double bent.			
	Length, mm	200	250	300
	Each	.65	1.00	1.30
48524.	Tongs, Crucible, of forged steel, nickel plated, single bent.			
	Length, mm	200	250	300
	Each	.50	.70	1.00
48528.	Tongs, Crucible, of forged steel, nickel plated, double bent.			
	Length, mm	200	250	300
	Each	.65	.85	1.20
48532.	Tongs, Crucible, of pure wrought nickel, double bent; 200 mm long.			2.00
48536.	" " " solid German silver, double bent, 230 mm long.			1.50
48540.	" " " with platinum tips or shoes. Our crucible tongs of steel No. 48528, of pure nickel No. 48532 and of solid German silver No. 48536 are furnished with platinum shoes or tips at the lowest market price of platinum.			2.50
48544.	Tongs, Crucible, of pure wrought nickel with nickel chromium tips, double bent, 200 mm long. A new substitute for platinum tipped tongs and highly recommended.			2.50
48548.	Tongs, Crucible, of malleable iron, single bent, heavy, for assay crucibles.			
	Length, inches	12	17	
	Each	.40	.50	
48552.	Tongs, Crucible, of wrought iron, double bent, 30 inches long; heavy for assay crucibles			1.75
48556.	Tongs, Cupel, of steel with curved ends and guide pin; 22 inches long.			1.00
48560.	" " " with bent ends and guide pin. Length, inches	20	25	30
	Each	1.00	1.00	1.00
48564.	Tongs, Scorifier, of spring steel. Length, inches	20	30	36
	Each	1.00	1.00	1.00



No. 48568

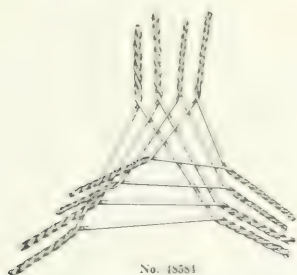


No. 48572



No. 48576

48568.	Triangles, of twisted iron wire. Length of side, inches	1½	2	3
	Each	.05	.05	.05
	Per dozen	.50	.50	.50
48572.	Triangles, of iron wire covered with pipe-stem.			
	Length of side, inches	1½	2	2½
	Each	.05	.05	.05
	Per dozen	.50	.50	.50
48576.	Triangles, of iron wire covered with pipe-stem, flanged in center.			
	Length of side, inches	1½	2	2½
	Each	.08	.08	.08
	Per dozen	.75	.75	.75



No. 48581

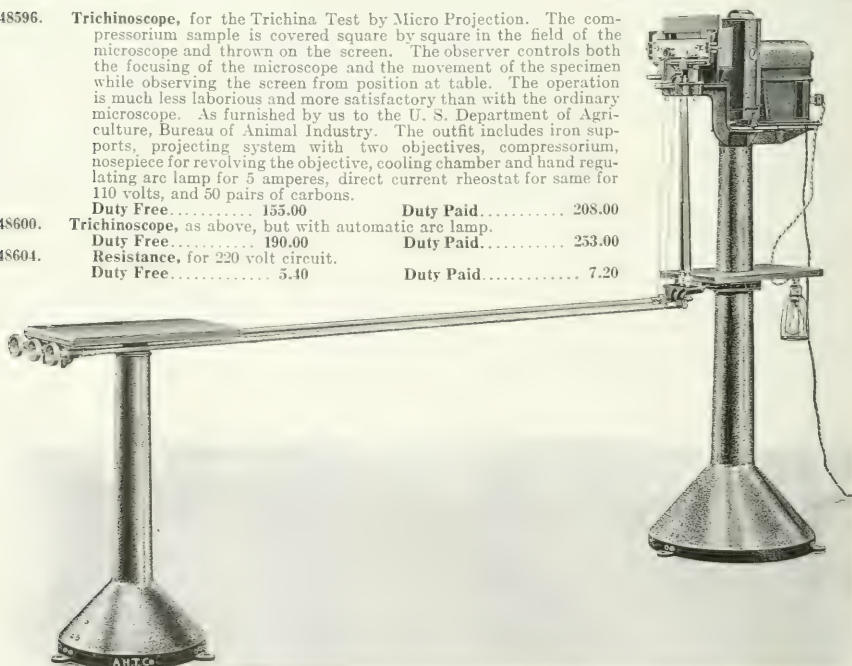


Nos. 48588 and 48592

48580.	<b>Triangles, Solid Nickel.</b>				
	Length of side, inches.....	1½	2	2½	3
	Each.....	.15	.20	.25	.30
48584.	<b>Triangles, Hoskins Nickel Chromium.</b> of heavy wire of square cross section and distinctly superior to triangles made of other market alloys of nickel and chromium. The alloy of which these triangles is made contains practically no iron and takes on a thin adherent protective coat of oxide which neither peels nor rubs off and which prevents the triangle adhering to platinum ware placed upon it.				
	Length of side, inches.....	1½	2	2½	3
	Each.....	.20	.25	.30	.35
48588.	<b>Triangles, Opaque Fused Silica.</b>				
	Length of each side, inches.....	1½	2	2½	3
	Each.....	.75	.90	1.00	1.15
48592.	<b>Triangles, Nichrome Wire covered with pure fused opaque silica.</b>				
	Length of each side, inches.....	1½	2	2½	3
	Each.....	.25	.35	.40	

48596. **Trichinoscope, for the Trichina Test by Micro Projection.** The compressorium sample is covered square by square in the field of the microscope and thrown on the screen. The observer controls both the focusing of the microscope and the movement of the specimen while observing the screen from position at table. The operation is much less laborious and more satisfactory than with the ordinary microscope. As furnished by us to the U. S. Department of Agriculture, Bureau of Animal Industry. The outfit includes iron supports, projecting system with two objectives, compressorium, nosepiece for revolving the objective, cooling chamber and hand regulating arc lamp for 5 amperes, direct current rheostat for same for 110 volts, and 50 pairs of carbons.

48600.	<b>Duty Free.....</b>	155.00	<b>Duty Paid.....</b>	208.00
48601.	<b>Trichinoscope, as above, but with automatic arc lamp.</b>			
	<b>Duty Free.....</b>	190.00	<b>Duty Paid.....</b>	253.00
48604.	<b>Resistance, for 220 volt circuit.</b>			
	<b>Duty Free.....</b>	5.40	<b>Duty Paid.....</b>	7.20

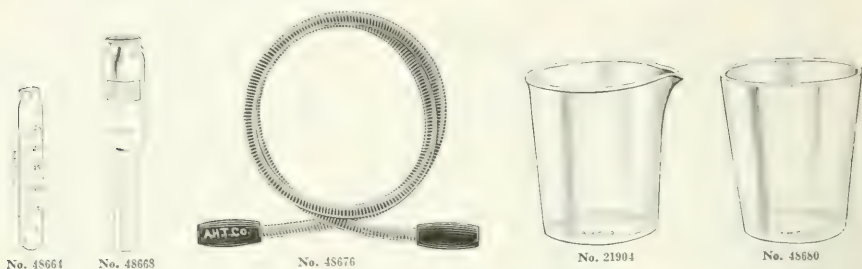


No. 48596



48608.	Tripod, of cast iron, 6 inches high with ring 3 inches inside diameter; suitable for alcohol lamps or small burners.								
48612.	Tripods, of cast iron, smoothly finished and well japanned; 9 inches high.								
	Outside diameter, inches	4	5	6	8	10	12		
	Each	.25	.25	.30	.50	.65	.80		
48616.	Tripods, of cast iron, smoothly finished and well japanned, with concentric rings; height 9 inches.								
	Outside diameter, of rings inches	5	6	8	10	12			
	Number of rings	2	3	5	6	8			
	Each	.35	.40	.75	1.00	1.40			
48620.	Tripod, of iron, with adjustable support for burner, 9 inches high with ring 3½ inches inside diameter								.75
48624.	Tripod, of iron, with triangular top; 9 inches high.								
	Length of side, cm			10	12	15	20		
	Height, cm			18	20	23	25		
	Each			.50	.60	.70	.80		
48628.	Tripod, Genth, exactly as used in the John Harrison Chemical Laboratory, University of Pennsylvania; of cast iron, with slip-in legs and removable plate; diameter 10½ inches, diameter of removable plate 7½ inches, height 7¼ inches.								1.00
48632.	Tripods, of sheet iron, with metal chimney for the protection of the flame; very convenient for flat bottom flasks or wire gauze.								
	Height, mm				240	265	290		
	Height of chimney, mm				100	115	130		
	Inside diameter of chimney, mm				100	125	130		
	Each				.50	.65	.90		
48636.	Tripod, of sheet iron, with metal chimney for protection of the flame, with supports curved downward to take round bottom flasks, evaporating dishes, etc.; height 200 mm by 60 mm diameter of chimney								.60
48640.	Tubes, Brass, T-shape. Bore, inches			½	⅜	¼	⅛	⅙	
	Each			.30	.35	.40	.45	.50	
48644.	Tubes, Brass, Y-shape. Bore, inches			½	⅜	¼	⅛	⅙	
	Each			.30	.35	.40	.45	.50	
48648.	Tubes, Glass, T-shape. Bore, mm	3	5	6	9	12	18	25	
	Each	.06	.08	.09	.10	.14	.30	.45	
48652.	Tube, Glass, T-shape, with two Geissler stopcocks, bore 5 mm								2.25
48656.	Tubes, Glass, U-shape. Bore, mm	3	5	6	9	12	18	25	
	Each	.06	.08	.09	.10	.14	.30	.45	
48660.	Tubes, Glass, Y-shape. Bore, mm	3	5	6	9	12	18	25	
	Each	.06	.08	.09	.10	.14	.30	.45	

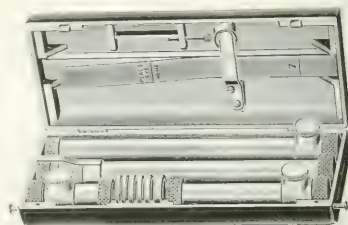




48664.	Tube, Vivien, for sugar analysis, as described in Fröhling & Schultz.....	.60
48668.	Tube, Hortvet, for use in the centrifuge in determining lead precipitates in the analysis of sugar and syrup. See <i>Bulletin No. 107 of the U. S. Department of Agriculture, Bureau of Chemistry</i> ....	.75
48672.	Tubing, Flexible Metallic, recommended as being safer and much more permanent than rubber tubing. $\frac{1}{8}$ inch diameter. Per foot.....	.20
48676.	Tubing, Flexible Metallic, in lengths for Bunsen burner connections; with rubber connectors at both ends; $\frac{1}{4}$ inch diameter. Length, feet.....	2 .25 2 $\frac{1}{2}$ .30 3 .50
	Each.....	
48678.	Extra Rubber Connectors, each.....	.05
21904.	Tumbler, of glass, with spout, capacity 7 oz.....	.10
48680.	" as above, without spout.....	.05



No. 48681



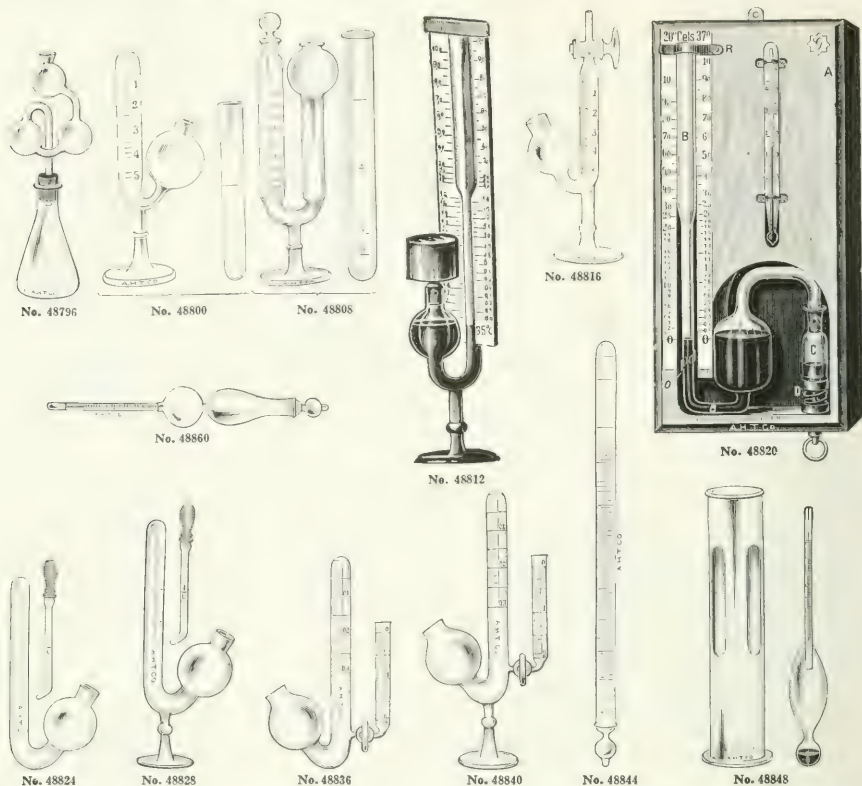
No. 48701

48684.	Turbidimeter, Jackson, for determining sulphates in water analysis, etc., complete with 22 cm tube.	12.00
48688.	Extra 22 cm tube, for above.....	2.50
48692.	" 75 cm ".....	5.00
48696.	Brass extension for use with long tubes.....	3.00
48700.	Candles, per dozen.....	2.50
48704.	Turbidimeter, U. S. Geological Survey type, as used in water analysis in connection with water plants, filtration installations, etc.; as described in <i>Bulletin 151 of the U. S. Geological Survey and Bulletin 8 of the Division of Hydrography</i> . Complete for both color and turbidity, packed in morocco covered case.....	30.00
48708.	Turbidimeter, as above, color outfit only, consisting of 6 amber color discs and 4 aluminum color tubes, packed in morocco covered case.....	27.00
48712.	Turbidity Tape, flexible, with rod, in wooden case.....	5.00

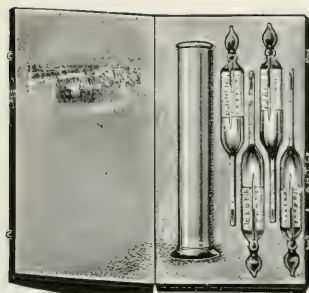
Large equipment lists can not always be made up from the catalogues of any one manufacturer or dealer. The leading European manufacturers of Laboratory Apparatus supply us with their original catalogues in limited quantities for distribution to intending purchasers. A partial list of such manufacturers is found on page V.

A selection of catalogues of the leading manufacturers of Europe can be obtained from us more promptly than by writing to all of the firms in whose goods you are interested.





48792.	Urea Bulb, Folin, for determination of urea.....	1.00
48796.	Urea Apparatus, Folin, complete, consisting of special urea Bulb No. 48792, flask and rubber stopper. ....	1.30
48800.	Saccharometer, Einhorn Fermentation, for the determination of sugar in urine; consisting of a graduated fermentation tube and a graduated test tube. The percentage of sugar present is read directly on the tube.....	.75
48804.	Saccharometers, set of two, one for the urine under examination and the other for a normal urine to which glucose has been added for the purpose of testing the efficiency of the yeast used. ....	1.50
48808.	Saccharometer, Lohnstein, for the accurate determination of sugar in diluted urine.....	2.25
48812.	Saccharometer, Lohnstein Precision or large model, for use with undiluted urine.....	6.00
48816.	Fermentation Saccharometer, Einhorn's improved form with glass stopcock and graduated test tube as furnished with No. 48800.....	2.00
48820.	Fermentation Saccharo-manometer, on wooden board for hanging on the wall. As described in <i>Medizinischen Wochenschrift</i> , 52, Jahrg., Heft 48. A new and convenient device for estimating the sugar in urine with an accuracy approximating the polarimetric method.....	9.00
48824.	Ureometer, Doremus, for the quantitative determination of urea in urine by the hypobromite method; with pipette, but without glass foot.....	.75
48828.	Ureometer, Doremus, same as No. 48824, on glass foot.....	1.00
48832.	Dropping Pipette, only, for use with No. 48824 or No. 48828.....	.20
48836.	Ureometer, Doremus-Hinds, improved form, with graduated side tube with glass stopcock from which the exact amount of urine may be introduced into the fermentation tube without any gas escaping from the bulb; without foot.....	2.50
48840.	Ureometer, Doremus-Hinds, same as No. 48836 on glass foot.....	2.75
48844.	Uricometer, Ruhemann, for the quantitative determination of uric acid.....	2.50
48848.	Urinometer, Squibb, graduated from 1.000 to 1.060; length 120 mm; in case with cylinder but without thermometer.....	.75
48852.	Cylinder only for above.....	.15
48856.	Thermometer only for above.....	.40
48860.	Urino-Pycnometer, Saxe, for the rapid determination of the specific gravity of small quantities of urine, with cylinder, in case.....	2.50



No. 48864



No. 48924



No. 48884



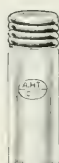
No. 48900



No. 48904



No. 48908



No. 48916



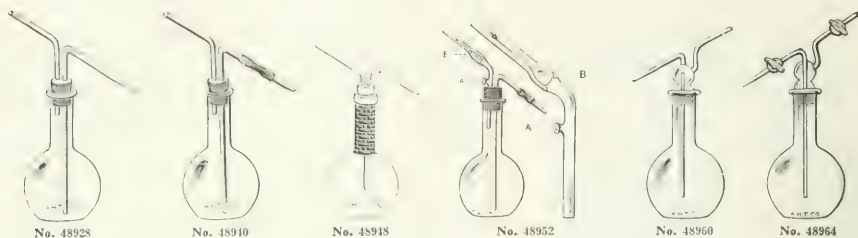
No. 48920



No. 48896

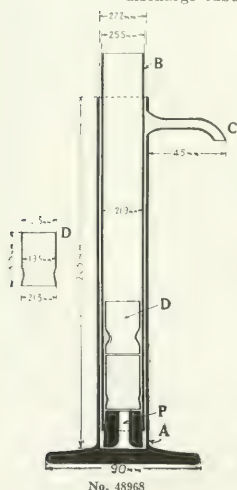
48864.	Urinometer, Precision, set of 4 spindles with a range of 1.0060 to 1.0380, for 100 cc of urine; with cylinder, in case. Can be also used for the calculation of the lowering of the freezing point in albumen and sugar-free urine by use of the factor 0.75° C. See <i>Zeitschrift für angewandte Chemie</i> 1902, Seite 1072 and Sahli "Lehrbuch der klinischen Untersuchungsmethoden, 5. Auflage 1909, Seite 752. Per set.....	6.00
48868.	Urinometer, Precision, same as above but with thermometer on each spindle. Per set.....	8.00
48872.	Urinometer, Vogel, for accurately determining the specific gravity of urine, consisting of two spindles graduated respectively from 1.000 to 1.025 and from 1.025 to 1.050; with cylinder.....	1.50
48876.	Cylinder only for above.....	.50
48880.	Spindles " " each.....	.50
48884.	Vapor Density Apparatus, Victor Meyer, improved form, complete.....	2.00
48888.	Inner Tube only for above.....	1.00
48892.	Outer Tube.....	1.00
48896.	Glass Bottle with ground glass stopper for above.....	.10
48900.	Vials, glass stoppered, flat bottom with slight neck and ground in air tight stopper; so-called "Specimen" vials.	
	Capacity, cc.....	2 3 4 6 8
	Per 10.....	.55 .55 .60 .75 .90
48904.	Vials, glass stoppered, with flat bottom, without neck.	
	Height, mm.....	50 65 80 80
	Diameter, mm.....	16 18 20 25
	Each.....	.12 .15 .18 .20
48908.	Vials, homeopathic, long form, with neck and flat bottom and cork stopper.	
	Height, mm.....	63 75 90 105 120
	Diameter, mm.....	11 12 14 17 20
	Per gross.....	1.25 1.50 2.00 3.00 4.00 5.00
48912.	Vials, homeopathic, short form, with neck and flat bottom and cork stopper.	
	Height, mm.....	45 55 63 70 75 83
	Diameter, mm.....	14 16 17 20 23 24
	Per gross.....	1.25 1.50 2.00 3.00 4.00 5.00
48916.	Vials, homeopathic, short form, with neck and flat bottom and cork-lined metal screw-cap.	
	Height, mm.....	48 58 63 63 75 88 138
	Diameter, mm.....	15 18 19 20 22 22 22
	Per gross.....	3.00 3.75 4.00 5.00 7.00 7.50 8.00 10.50
48920.	Vials, cylindrical specimen, so-called "Shell Vials," without constriction at neck, with flat bottom and including cork stoppers.	
	Height, mm.....	25 25 25 35 35 35 40 40 40 50 50
	Diameter, mm.....	8 10 15 8 10 15 10 15 20 12 20
	Per 100.....	.85 .85 .90 .85 .85 .90 .85 .90 1.10 .90 1.25
	Height, mm.....	50 60 60 60 70 70 70 80 80 80 80
	Diameter, mm.....	25 13 20 25 15 20 25 16 20 25
	Per 100.....	2.30 .90 1.50 2.75 1.10 1.75 3.00 1.25 1.75 3.50
48924.	Warming Table, Huber, with top of heavy copper 14 inches long by 4 inches wide; for fixing blood films, drying micro sections, etc.....	1.25





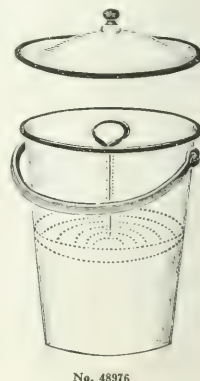
48928.	Washing Bottle, consisting of a No. 2S104 Flask, extra heavy, rubber stopper and glass tubes.				
	Capacity, cc.....	250	500	1000	2000
	Each.....	.40	.50	.75	1.00
48932.	Fittings only for Washing Bottle No. 48928, i. e., rubber stopper and glass tubes without flask.....	.10			
48936.	Washing Bottle, New Jena Glass, with rubber corks and Jena glass tubes.				
	Capacity, cc.....	250	500	1000	1500
	Each.....	.68	.90	1.05	1.20
48940.	Washing Bottle, Faraday, consisting of a No. 2S104 flask, extra heavy, with rubber stopper, glass tubes with rubber joint in outlet tube to give flexibility.				
	Capacity, cc.....	250	500	1000	2000
	Each.....	.40	.50	.75	1.00
48944.	Fittings only for Washing Bottle No. 48940, i. e., rubber stopper and glass tubes without flask.....	.10			
48948.	Washing Bottle, same as No. 48940 but with rattan covered neck. For convenient holding while hot.				
	Capacity, cc.....			500	1000
	Each.....			.70	.90
48952.	Washing bottle, arranged for continuous flow, 500 cc capacity.....				.70
48956.	Fittings only for Washing Bottles, consisting of rubber stopper, and glass tubes arranged for continuous flow.....				.50
48960.	Washing Bottle, for volatile liquids, with ground in glass stopper.				
	Capacity, cc.....	125	250	500	1000
	Each.....	.50	1.00	1.25	1.50
48964.	Washing Bottles, for volatile liquids, with ground in glass stopper and two glass stopcocks.				
	Capacity, cc.....	125	250	500	1000
	Each.....	2.25	2.50	2.75	3.00

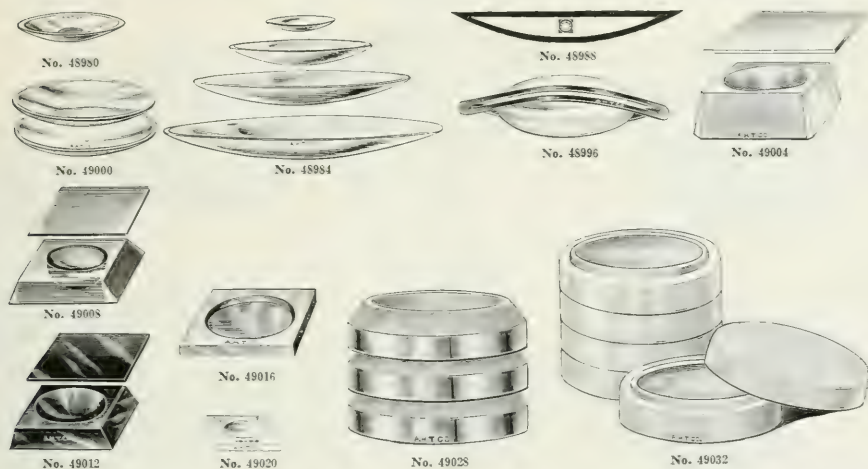
48968. Washing Apparatus, Bain, for microscopic material; consisting of a glass cylinder with base and a discharge tubulation at the top; with a plain glass tube fitting into same with a one-hole cork stopper at bottom and a set of 6 sieve thimbles, one end of which is bound with fine silk bolting cloth. The washing liquid is allowed to drop into the inside cylinder and, after passing through the sieves, rises in the outside cylinder and flows off through the outlet "C," with 6 sieve thimbles. 2.50



48972. Extra Sieve Thimbles, each..... .25

48976. Waste Pail, Aseptic Enamel Ware; of seamless steel, white enamelled, both acid and fire proof; very convenient in the laboratory; with perforated tray which retains the solid matter such as filter paper, etc.; which may be lifted out before the bucket is emptied; 16 inches high, 12 inches diameter, 5 gallons capacity. 6.00



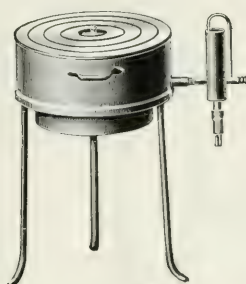
[illegible]



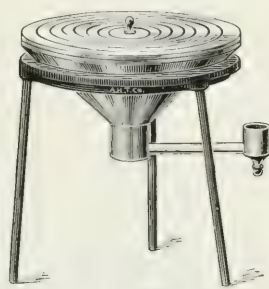
	No. 49064	No. 49068			No. 49072		No. 49076		
49040.	Water Baths, of heavy copper, tin lined; hemispherical form, with concentric rings, cover and steam escape.	Diameter, inches.....	4	5	5½	6	8	10	12
	Each.....	1.00	1.25	1.40	1.60	2.50	5.00	9.50	
49044.	Water Baths, same as No. 40940 but with cock and exhaust for steam heating.	Diameter, inches.....				6	8	10	
	Each.....					3.50	4.50	8.00	
49048.	Water Baths, same as No. 40940 but with constant water level.	Diameter, inches.....	4	5	5½	6	8	10	12
	Each.....	1.60	1.85	2.00	2.20	3.10	5.60	10.10	
49052.	Water Baths, of cast iron, white enamelled inside; with flange for supporting tripod and copper rings.	Diameter, mm.....				120	150	200	240
	Each.....				1.50	2.25	3.50	4.60	
49056.	Water Bath, of pressed sheet steel, inside white enamelled, outside maroon enamelled; with copper rings but without tripod.	Diameter, mm.....						160	200
	Each.....						3.50	5.00	
49060.	Water Bath, of polished copper, tin lined; with cover, steam escape, copper concentric rings and perforated plate for test tubes.	Diameter, inches.....					6	8	
	Each.....						3.00	4.50	
49064.	Water Bath, Blair, with test tube rack; of polished copper, 175 mm diameter; as used in iron analysis							3.50	
49068.	Water Bath, Hofmann, of heavy polished copper with diameter at top 8 inches, with a set of concentric rings and plate with five holes of different sizes each with cover. With constant water level and handles, without tripod.							6.75	
49072.	Water Bath, Royal Berlin Porcelain, consisting of two porcelain dishes fitting one inside the other.	Outside diameter, mm.....					110	140	
	Each.....						1.20	1.80	
49076.	Water Level Regulator, of brass, can be attached to any of our water baths. The level of the water is regulated by adjusting the center brass tube; length 3½ inches.							1.50	



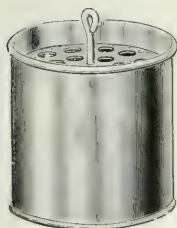
No. 49080



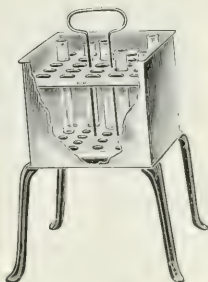
No. 49084



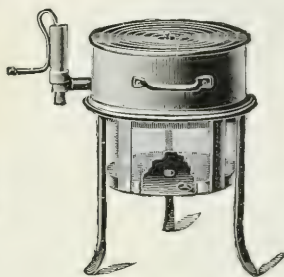
No. 49088



No. 49092



No. 49096

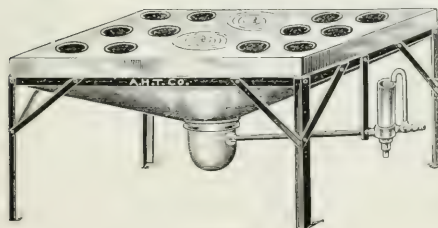


No. 49100



No. 49104

49080. Water Bath, new form, with water level regulator; of polished copper, 6 inches in diameter by 4 inches deep, on tripod 9 inches high. .... 6.00
49084. Water Bath, consisting of Bath No. 49040 of sheet steel, white enamelled inside and maroon enamelled outside, with copper rings, water level and special tripod to fit; 160 mm diameter ..... 6.00
49088. Water Baths, funnel form, with tripod and constant water level.  
Diameter, inches ..... 6 8  
Each ..... 3.50 4.50
49092. Water Bath, for dissolving steel samples; of heavy, polished copper, tinned inside, with test tube rack, 6 inches in diameter by 7 inches high, taking eighteen  $6 \times \frac{3}{8}$  inch dissolving tubes. .... 4.50
49096. Water Bath, rectangular, for dissolving steel samples, of heavy copper  $7\frac{1}{2}$  inches square by  $6\frac{1}{2}$  inches high; with perforated tray to hold 25 test tubes  $8 \times \frac{7}{8}$  inches; on support with iron legs. .... 6.50
49100. Water Bath, of cast iron, white enamelled inside, with copper rings, constant water level, tripod and safety gauge; for use with inflammable liquids. .... 160 200  
Diameter, mm. .... 9.00 11.50  
Each.....
49104. Perforated Inset, of polished copper, for use in water baths No. 49040 and No. 49064  
For bath, mm. .... 160 200  
To hold test tubes. .... 18 34  
Each..... 1.50 2.00

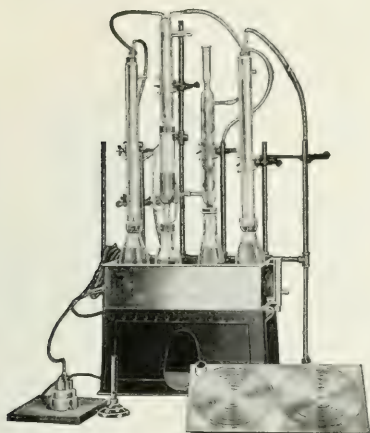


No. 49108

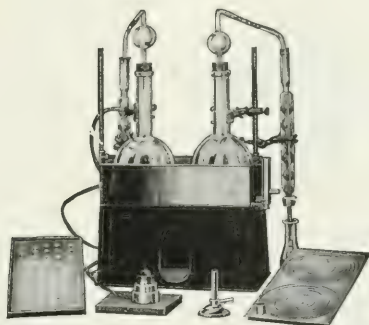
49108. Water Bath, Wiley, Patented, heavy copper, for economizing time and gas; with twelve holes  $3\frac{1}{2}$  inches in diameter and two holes  $5\frac{1}{2}$  inches in diameter. The top of the bath is  $14 \times 25\frac{1}{2}$  inches; the cup is of heavy spun copper and easily replaced when burnt out; without porcelain rings. .... 25.00





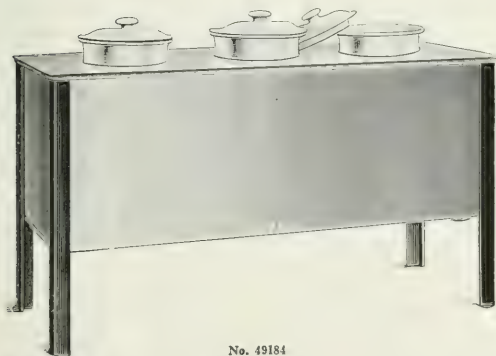


No. 49164

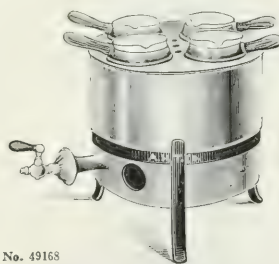


No. 49164

49164. Water Bath, Electric, of heavy polished copper, tin lined, with heating coil immersed in the water chamber. This coil is arranged for three heats, controllable by means of a one-plug switch. It will hold water at the boiling point when running on the high heat. The smaller size bath takes 400 Watts per hour on the high heat. At the rate of 8¢ per KW, the operating expense on the high heat is 3.2¢ per hour, on the medium heat 1½¢ and on the low heat ½¢ per hour. A removable cover is provided containing two sets of rings on the small bath and four sets on the large bath, also a removable copper tray resting inside of the bath for use with beakers, evaporating dishes, etc., immersed in the water as shown in illustration. The bath provides a very convenient method for the distillation of volatile liquids with absolute safety because of the immersion of the heating element, also fat extractions, etc., as shown in illustration. No special wiring is necessary, the connection being made with ordinary lighting circuit either alternating or direct current but voltage must be specified in ordering.
- |                    |            |             |
|--------------------|------------|-------------|
| Size, inches ..... | 15 x 8 x 5 | 15 x 15 x 5 |
| Each .....         | 35.00      | 54.00       |



No. 49184

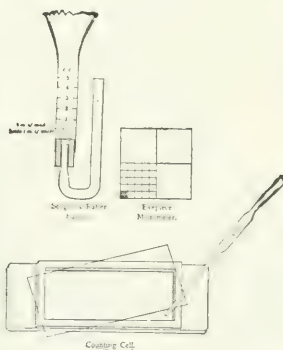


No. 49168

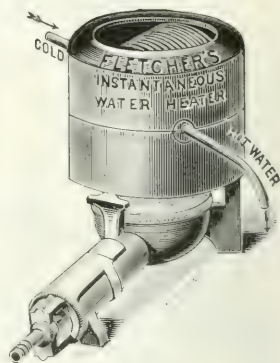
49168. Water Bath, Matthews, as used in the Philadelphia Textile School, with four porcelain beakers, 325 cc capacity, with spout. Complete with gas burner, protection plate and beaker collars.... 21.00
49176. Water Bath, Matthews, as above, for use with either glycerine or calcium chloride as heating medium; of extra heavy copper with hard brazed seams; with four porcelain beakers..... 26.00
49184. Water Bath, for Dyers as widely used in the textile industry; with beakers or dye pots our No. 21832 with lid but without burner. Number of beakers..... 3 6
- |            |       |       |
|------------|-------|-------|
| Each ..... | 20.75 | 36.50 |
|------------|-------|-------|
49192. Water Bath, for Dyers same as above but of heavy copper and with hard brazed seams for use with glycerine or calcium chloride as a heating medium. Number of beakers..... 3 6
- |            |       |       |
|------------|-------|-------|
| Each ..... | 25.75 | 44.00 |
|------------|-------|-------|



No. 49200

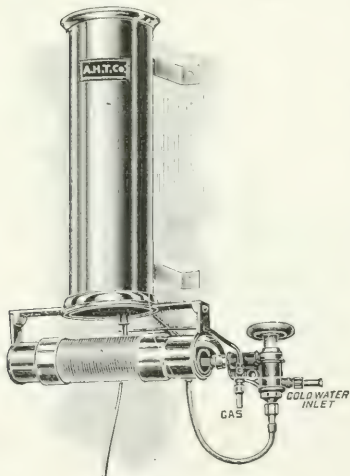


No. 49204 to 49240



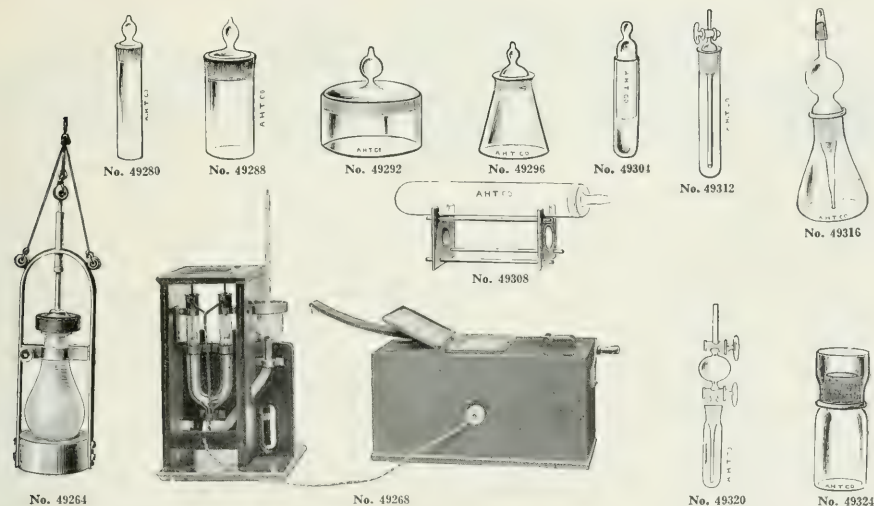
No. 49244

49200. Water Bath, Reischauer, for volumetric maltose determinations, etc.; with tripod and tube holder. 8.00
- Water Examination Apparatus, Whipple, for the Microscopic Examination of Water, as described in "The Microscopy of Drinking Water," by Geo. C. Whipple; consisting of the following:—
49204. Sedgewick-Rafter Funnel, graduated, with attachment and rubber stopper. 2.50
49208. " " ungraduated " " " " " " 1.50
49212. Berkshire Sand, per lb. .10
49216. Bolting cloth discs, per dozen. .15
49220. Support for funnel. 1.30
49224. Counting Cell. 3.00
49228. Cover Slip. .10
49232. Eyepiece Micrometer. 3.50
49236. Pipettes 1 cc and 5 cc. .20
49240. Flask, graduated, 25 cc. .30
49244. Water Heater, Fletcher, with attachment for instantaneously heating water. When connected with cold water faucet hot water is delivered in three seconds after gas is lighted. Gas supply of  $\frac{1}{4}$  inch clear bore is recommended. Complete with burner as illustrated. 6.00



No. 49256

49248. Heating Attachment only, of No. 49244 without burner. 4.00
49252. Water Heater, same as No. 49244 but with wheel valve, for use with gasoline gas. 7.00
49256. Water Heater, for instantaneously delivering water from luke warm to boiling point when connected with cold water faucet. Gas supply should be  $\frac{1}{4}$  inch clear bore. Small size consumes 20 ft. of gas per hour and large size 40 ft. The small size will heat 1 pt. of water per minute from 50° F. or will boil 15 quarts per hour, the capacity of the larger size being about double that of the smaller. These heaters are supplied with a pilot light and are made entirely of brass and copper, polished and nickel plated.
- | Size | Small | Large |
|------|-------|-------|
| Each | 25.00 | 30.00 |
49260. Extra for burner adjusted for gasoline gas on either size. 1.00

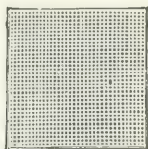


49264. **Water Sampling Apparatus, Esmarch**, consisting of a glass bottle in a metal frame with parts so arranged that when the apparatus is lowered to the desired depth the stopper is removed, whereupon the bottle fills, after which the stopper is replaced. . . . . 9.00
49268. **Water Tester, Dionic**, for the exact measurement of small quantities of known substances in water by measurement of the electric conductivity of the solution. Consisting of a special glass vessel with terminals for the water under test and a conductivity meter reading directly and without calculation the conductivity of any electrolytic solution in the tube, as used for measuring leakage into surface condensers, testing of boiler feed water, hard material in sewage, determination of sewage effluent, the purity of distilled water, etc.; for very weak solutions.
- |                    |        |                    |        |
|--------------------|--------|--------------------|--------|
| Duty Free. . . . . | 111.00 | Duty Paid. . . . . | 148.00 |
| Duty Free. . . . . | 114.00 | Duty Paid. . . . . | 152.00 |
49272. **Water Tester, Dionic**, for use with sea water and solutions of a similar nature.
49276. **Wax, Sealing**, first quality, in sticks. Per lb. . . . . .50
49280. **Weighing Bottles**, high form, with flat bottom and ground glass stopper.
- |                       |     |     |     |     |
|-----------------------|-----|-----|-----|-----|
| Height, mm. . . . .   | 60  | 80  | 100 | 120 |
| Diameter, mm. . . . . | 10  | 15  | 23  | 32  |
| Each. . . . .         | .18 | .20 | .30 | .40 |
49284. **Weighing Bottles**, same as No. 49280 but with round bottom.
- |                       |     |     |     |     |
|-----------------------|-----|-----|-----|-----|
| Height, mm. . . . .   | 60  | 80  | 100 | 120 |
| Diameter, mm. . . . . | 10  | 15  | 23  | 32  |
| Each. . . . .         | .18 | .20 | .30 | .40 |
49288. **Weighing Bottles**, wide form with flat bottom and ground glass stopper.
- |                       |     |     |     |     |     |     |
|-----------------------|-----|-----|-----|-----|-----|-----|
| Height, mm. . . . .   | 40  | 50  | 60  | 70  | 80  |     |
| Diameter, mm. . . . . | 25  | 30  | 38  | 30  | 35  | 45  |
| Each. . . . .         | .25 | .30 | .40 | .35 | .40 | .50 |
49292. **Weighing Bottles**, low form, with flat bottom.
- |                       |     |      |      |
|-----------------------|-----|------|------|
| Height, mm. . . . .   | 30  | 30   | 30   |
| Diameter, mm. . . . . | 50  | 60   | 70   |
| Each. . . . .         | .85 | 1.10 | 1.50 |
49296. **Weighing Bottle**, conical form with flat bottom and ground glass stopper.
- |                       |     |     |     |
|-----------------------|-----|-----|-----|
| Capacity, cc. . . . . | 15  | 30  | 60  |
| Each. . . . .         | .35 | .40 | .50 |
49300. **Weighing Bottle**, conical form, with extra wide mouth and with lower part of stopper sealed over. Otherwise the same as No. 49296. Capacity, 15 cc. . . . . .35
49304. **Weighing Bottle**, 60 mm long, consisting of two cylindrical tubes, one sliding into the other. . . . . .20
49308. **Weighing Bottle Support**, of metal, for bottles such as No. 49284 and No. 49304. Can be used either vertically or horizontally. . . . . .1.50
49312. **Weighing Bottle**, Grethen, with ground in stopper, with glass stopcock. For weighing corrosive liquids. Capacity 2 cc. . . . . .2.00
49316. **Weighing Bottle**, Hill, 30 cc, with ground in bulb, pipette and glass cap. . . . . .1.50
49320. **Weighing Bottle**, Lunge, with ground in stopper with bulb and two glass stopcocks. For weighing corrosive liquids. . . . . .3.50
49324. **Weighing Bottle**, Mc Myn Patent, with glass cap ground on outside of neck, 25 cc capacity. Very convenient because contents never interfere with the ground surface. . . . . .50

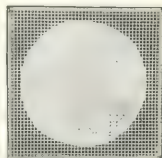




No. 49336



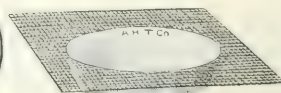
No. 49380



No. 49396



No. 49404



No. 49408

49328.	Wire, Aluminum. B. & S. gauge.....	12	16	18	20	22			
	Per oz.....	.08	.08	.10	.10	.12			
	Per lb.....	1.00	1.00	1.25	1.25	1.50			
49332.	Wire, Soft Brass, wound on spools of $\frac{1}{4}$ lb. each.								
	B. & S. gauge.....	16	18	20	22	24	26	28	30
	Per spool.....	.18	.18	.18	.20	.22	.23	.28	.35
49336.	Wire, Copper, bare, wound on spools of $\frac{1}{4}$ lb. each.								
	B. & S. gauge.....	16	18	20	22	24	26	28	30
	Per spool.....	.18	.18	.18	.20	.22	.23	.28	.35
49340.	Wire, German Silver, wound on spools of $\frac{1}{4}$ lb. each.								
	B. & S. gauge.....	16	18	20	22	24	26	28	30
	Per spool.....	.35	.35	.40	.45	.50	.50	.60	.70
49344.	Wire, Copper, single cotton coated, wound on spools of $\frac{1}{4}$ lb. each.								
	B. & S. gauge.....	12	14	16	18	20	22	24	27
	Per spool.....	.20	.20	.20	.20	.25	.25	.25	.30
49348.	Wire, Copper, single silk coated. B. & S. gauge.....	12	14	16	18	20	22	24	27
	Per ounce.....	.15	.15	.15	.15	.15	.20	.20	.25
49352.	Wire, Iron, chemically pure for standardizing, containing 99.85% Fe. Per ounce.....								.15
	Per pound.....								.90
49356.	Wire, Pure Nickel. B. & S. gauge.....	16	18	20	22	24	26		
	Per ounce.....	.16	.16	.17	.18	.19	.20		
	Per pound.....	2.10	2.10	2.15	2.20	2.25	2.30		
49360.	Wire, Nichrome. This alloy is practically non-corrosive with an extremely high melting point, i.e., 2500° F., and with a specific resistance equal to that of mercury.								
	B. & S. gauge.....	14	16	18	20	22	24	26	28
	Per ounce.....	.26	.28	.30	.35	.40	.45	.50	.55
	Per pound.....	3.40	3.60	4.00	4.40	4.85	5.40	6.00	6.80
49364.	Wire, Nichrome, ribbon form, in widths from $\frac{1}{32}$ to 1 inch and any thickness from B. & S. gauge No. 14 to 40. Prices on application.								
49368.	Wire Gauze, Brass, for general use.								
	Mesh.....	10	20	30	40	60	80	100	
	Per square foot.....	.50	.50	.55	.60	.70	1.00	1.45	
49372.	Wire Gauze, Copper, for combustion. Mesh.....								
	Per square foot.....	.50	.60	.70	1.00	1.45			
49376.	Wire Gauze, Iron. Mesh. 6	10	14	16	20	30	40	60	
	Per square foot.....	.22	.27	.28	.32	.35	.37	.45	.70
49380.	Wire Gauze, Brass, in squares of proper thickness and mesh for heating beakers, dishes, etc., over flame. Size, inches.....					4	5	6	
	Per square.....					.10	.15	.20	
49384.	Wire Gauze, Nickel, 30 mesh. Per square foot.....								1.50
49388.	Wire Gauze, Nickel Chromium, of great durability because of the high heat resisting quality of this alloy. Size, inches.....					4	5	6	
	Per square.....					.40	.60	.80	
49392.	Wire Gauze, Iron, in squares, for supporting dishes, etc. Size, inches	4	5	6	8				
	Per square.....	.05	.06	.08	.18				
	Per dozen squares.....	.50	.60	.80	2.00				
49396.	Wire Gauze, with Asbestos Center, of tinned iron wire, in squares. Size, mm	100	120	150					
	Per square.....	.12	.15	.20					
49400.	Wire Gauze, Asbestos Covered, Carlizek, of brass but with each wire covered with asbestos coating by a new process; very much more durable and economical of heat than those with asbestos center pressed on the wire gauze; in squares. Size, cm.....	10	12	15					
	Per square.....	.35	.45	.50					
49404.	Wire Gauze, as above, in circles with metallic binding. Diameter, cm.....	10	12	15					
	Per square.....	.85	1.00	1.25					
49408.	Wire Gauze, of tinned iron wire, with hemispherical asbestos center.								
	Size, inches.....	4	5	6					
	Per square.....	.45	.55	.60					

## APPENDIX

## Mendeleeff's Periodic System of the Elements

Revised by CHARLES BASKERVILLE

Series	Zero Group	Group I	Group II	Group III	Group IV	Group V	Group VI	Group VII	
0 $\pi$									
1		$y$ H=1.008							
2	He=3.99	Li=6.94	Gl=9.1	B=11.0	C=12.00	N=14.01	O=16.00	F=19	
3	Ne=20.2	Na=23.00	Mg=24.32	Al=27.1	Si=28.3	P=31.04	S=32.07	Cl=35.46	
4	A=39.9	K=39.10	Ca=40.07	Sc=44.1	Ti=48.1	V=51.0	Cr=52.0	Mn=54.93	$\left\{ \begin{array}{l} \text{Fe} = 55.84 \\ \text{Co} = 58.97 \\ \text{Ni} = 58.68 \\ (\text{Cu}) \end{array} \right.$
5		Cu=63.57	Zn=65.37	Ga=69.9	Ge=72.5	As=74.96	Se=79.2	Br=79.92	
6	Kr=82.92	Rb=85.45	Sr=87.63	Yt=89.0	Zr=90.6	Cb=93.5	Mo=96.0		$\left\{ \begin{array}{l} \text{Ru} = 101.7 \\ \text{Rh} = 102.9 \\ \text{Pd} = 106.7 \\ (\text{Ag}) \end{array} \right.$
7		Ag=107.88	Cd=112.4	In=114.8	Sn=119.0	Sb=120.2	Te=127.5	I=126.92	
8	Xe=130.2	Cs=132.81	Ba=137.37	La=139.0	Ce=140.25	(Pr=140.6)	(Nd=144.3)		$\left\{ \begin{array}{l} \text{Sa} = 150.4 \\ \text{Eu} = 152 \\ \text{Gd} = 157.3 \end{array} \right.$
9	—	—	—	Er=167.7	—	Yb=172.0	—	—	
10	—	—	—	—	—	Ta=181.5	W=184.0	—	$\left\{ \begin{array}{l} \text{Os} = 190.9 \\ \text{Ir} = 193.1 \\ \text{Pt} = 195.2 \\ (\text{Au}) \end{array} \right.$
11		Au=197.2	Hg=200.0	Tl=204.0	Pb=207.10	Bi=208			
12	Nt=222.4		Ra=226.4		Th=232.4		U=238.5		

Rare earth metals not placed:—Dy=162.5, Lu=174, Tb=159.2, Tm=168.5.

## International Atomic Weights for 1913\*

O = 16

Name	Symbol	Atomic Weight	Name	Symbol	Atomic Weight	Name	Symbol	Atomic Weight
Aluminium.....	Al	27.1	Holmium.....	Ho	163.5	Rhodium.....	Rh	102.9
Antimony.....	Sb	120.2	Hydrogen.....	H	1.008	Rubidium.....	Rb	85.45
Argon.....	A	39.88	Indium.....	In	114.8	Ruthenium.....	Ru	101.7
Arsenic.....	As	74.96	Iodine.....	I	126.92	Samarium.....	Sm	150.4
Barium.....	Ba	137.37	Iridium.....	Ir	193.1	Scandium.....	Sc	44.1
Bismuth.....	Bi	208.0	Iron.....	Fe	55.84	Selenium.....	Se	79.2
Boron.....	B	11.0	Krypton.....	Kr	82.92	Silicon.....	Si	28.3
Bromine.....	Br	79.92	Lanthanum.....	La	139.0	Silver.....	Ag	107.88
Cadmium.....	Cd	112.40	Lead.....	Pb	207.10	Sodium.....	Na	23.00
Caesium.....	Cs	132.81	Lithium.....	Li	6.94	Strontium.....	Sr	87.63
Calcium.....	Ca	40.07	Lutecium.....	Lu	174.0	Sulphur.....	S	32.07
Carbon.....	C	12.00	Magnesium.....	Mg	24.32	Tantalum.....	Ta	181.5
Cerium.....	Ce	140.25	Manganese.....	Mn	54.93	Tellurium.....	Te	127.5
Chlorine.....	Cl	35.46	Mercury.....	Hg	200.9	Terbium.....	Tb	159.2
Chromium.....	Cr	52.0	Molybdenum.....	Mo	96.0	Thallium.....	Tl	204.0
Cobalt.....	Co	58.97	Neodymium.....	Md	144.3	Thorium.....	Th	232.4
Columbium.....	Cb	93.5	Neon.....	Ne	20.2	Thulium.....	Tm	168.5
Copper.....	Cu	63.57	Nickel.....	Ni	58.68	Tin.....	Sn	119.0
Dysprosium.....	Dy	162.5	Nitron.....	Nt	222.4	Titanium.....	Ti	48.1
Erbium.....	Er	167.7	Nitrogen.....	N	14.01	Tungsten.....	W	184.0
Europium.....	Eu	152.0	Osmium.....	Os	190.9	Uranium.....	U	238.5
Fluorine.....	F	19.0	Oxygen.....	O	16.00	Vanadium.....	V	51.0
Gadolinium.....	Gd	157.3	Palladium.....	Pd	106.7	Xenon.....	Xe	130.2
Gallium.....	Ga	69.9	Phosphorus.....	P	31.04	Ytterbium.....	Yb	172.0
Germanium.....	Ge	72.5	Platinum.....	Pt	195.2	(Neoytterbium)		
Glinium.....	Gl	9.1	Potassium.....	K	39.10	Yttrium.....	Yt	89.0
Gold.....	Au	197.2	Praseodymium.....	Pr	140.6	Zinc.....	Zn	65.37
Helium.....	He	3.99	Radium.....	Ra	226.4	Zirconium.....	Zr	90.6

\* Compiled by the International Committee on Atomic Weights consisting of F. W. Clarke, W. Ostwald, T. E. Thorpe, and G. Urbain.

# Comparison of Metric and Customary Units from 1 to 10\*

## LENGTHS

Inches	Millimeters	Inches	Centimeters	Feet	Meters
0.03937 =	1	0.3937 =	1	1 =	0.304801
0.07874 =	2	0.7874 =	2	2 =	0.609601
0.11811 =	3	1 =	2.54001	3 =	0.914402
0.15748 =	4	1.1811 =	3	3.28083 =	1
0.19685 =	5	1.5748 =	4	4 =	1.219202
0.23622 =	6	1.9685 =	5	5 =	1.524003
0.27559 =	7	2 =	5.08001	6 =	1.828804
0.31496 =	8	2.3622 =	6	6.56167 =	2
0.35433 =	9	2.7559 =	7	7 =	2.133604
1 =	25.4001	3 =	7.62002	8 =	2.438405
2 =	50.8001	3.1496 =	8	9 =	2.743205
3 =	76.2002	3.5433 =	9	9.84250 =	3
4 =	101.6002	4 =	10.16002	13.12333 =	4
5 =	127.0003	5 =	12.70003	16.40417 =	5
6 =	152.4003	6 =	15.24003	19.68500 =	6
7 =	177.8004	7 =	17.78004	22.96583 =	7
8 =	203.2004	8 =	20.32004	26.24667 =	8
9 =	228.6005	9 =	22.86005	29.52750 =	9

## AREAS

Square Inches	Square Millimeters	Square Inches	Square Centimeters	Square Feet	Square Meters
0.00155 =	1	0.1550 =	1	1 =	0.09290
0.00310 =	2	0.3100 =	2	2 =	0.18581
0.00465 =	3	0.4650 =	3	3 =	0.27871
0.00620 =	4	0.6200 =	4	4 =	0.37161
0.00775 =	5	0.7750 =	5	5 =	0.46452
0.00930 =	6	0.9300 =	6	6 =	0.55742
0.01085 =	7	1 =	6.452	7 =	0.65032
0.01240 =	8	1.0850 =	7	8 =	0.74323
0.01395 =	9	1.2400 =	8	9 =	0.83613
1 =	645.16	1.3950 =	9	10.764 =	1
2 =	1,290.33	2 =	12.903	21.528 =	2
3 =	1,935.49	3 =	19.355	32.292 =	3
4 =	2,580.65	4 =	25.807	43.055 =	4
5 =	3,225.81	5 =	32.258	53.819 =	5
6 =	3,870.98	6 =	38.710	64.583 =	6
7 =	4,516.14	7 =	45.161	75.347 =	7
8 =	5,161.30	8 =	51.613	86.111 =	8
9 =	5,806.46	9 =	58.065	96.875 =	9

## VOLUMES

Cubic Inches	Cubic Millimeters	Cubic Inches	Cubic Centimeters	Cubic Feet	Cubic Meters
0.000061 =	1	0.0610 =	1	1 =	0.02832
0.000122 =	2	0.1220 =	2	2 =	0.05663
0.000183 =	3	0.1831 =	3	3 =	0.08495
0.000244 =	4	0.2441 =	4	4 =	0.11327
0.000305 =	5	0.3051 =	5	5 =	0.14159
0.000366 =	6	0.3661 =	6	6 =	0.16990
0.000427 =	7	0.4272 =	7	7 =	0.19822
0.000488 =	8	0.4882 =	8	8 =	0.22654
0.000549 =	9	0.5492 =	9	9 =	0.25485
1 =	16,387.2	1 =	16.3872	35.314 =	1
2 =	32,774.3	2 =	32.7743	70.629 =	2
3 =	49,161.5	3 =	49.1615	105.943 =	3
4 =	65,548.6	4 =	65.5486	141.258 =	4
5 =	81,935.8	5 =	81.9358	176.572 =	5
6 =	98,323.0	6 =	98.3230	211.887 =	6
7 =	114,710.1	7 =	114.7101	247.201 =	7
8 =	131,097.3	8 =	131.0973	282.516 =	8
9 =	147,484.5	9 =	147.4845	317.830 =	9

\* Table of Equivalents, U. S. Bureau of Standards.

## CAPACITIES

Milliliters (cc.)	U.S. Liquid Ounces	Milliliters (cc.)	U.S. Apothecaries' Drams	U.S. Apothecaries' Scruples	Milliliters (cc.)
1	= 0.03381	1	= 0.2705	0.8115	= 1
2	= 0.06763	2	= 0.5410	1	= 1.2322
3	= 0.10144	3	= 0.8115	1.6231	= 2
4	= 0.13526	3.6967	= 1	2	= 2.4645
5	= 0.16907	4	= 1.0820	2.4346	= 3
6	= 0.20288	5	= 1.3525	3	= 3.6967
7	= 0.23670	6	= 1.6231	3.2461	= 4
8	= 0.27051	7	= 1.8936	4	= 4.9290
9	= 0.30432	7.3934	= 2	4.0577	= 5
29.574	= 1	8	= 2.1641	4.8692	= 6
59.147	= 2	9	= 2.4346	5	= 6.1612
88.721	= 3	11.0901	= 3	5.6807	= 7
118.295	= 4	14.7869	= 4	6	= 7.3934
147.869	= 5	18.4836	= 5	6.4923	= 8
177.442	= 6	22.1803	= 6	7	= 8.6257
207.016	= 7	25.8770	= 7	7.3038	= 9
236.590	= 8	29.5737	= 8	8	= 9.8579
266.163	= 9	33.2704	= 9	9	= 11.0901

## MASSES

Grains	Grams	Avoirdupois Ounces	Grams	Troy Ounces	Grams
1	= 0.06480	0.03527	= 1	0.03215	= 1
2	= 0.12960	0.07055	= 2	0.06430	= 2
3	= 0.19440	0.10582	= 3	0.09645	= 3
4	= 0.25920	0.14110	= 4	0.12860	= 4
5	= 0.32399	0.17637	= 5	0.16075	= 5
6	= 0.38879	0.21164	= 6	0.19290	= 6
7	= 0.45359	0.24692	= 7	0.22506	= 7
8	= 0.51839	0.28219	= 8	0.25721	= 8
9	= 0.58319	0.31747	= 9	0.28936	= 9
15.4324	= 1	1	= 28.3495	1	= 31.10348
30.8647	= 2	2	= 56.6991	2	= 62.20696
46.2971	= 3	3	= 85.0486	3	= 93.31044
61.7294	= 4	4	= 113.3981	4	= 124.41392
77.1618	= 5	5	= 141.7476	5	= 155.51740
92.5941	= 6	6	= 170.0972	6	= 186.62088
108.0265	= 7	7	= 198.4467	7	= 217.72437
123.4589	= 8	8	= 226.7962	8	= 248.82785
138.8912	= 9	9	= 255.1457	9	= 279.93133

Avoirdupois Pounds	Kilograms	Troy Pounds	Kilograms
1	= 0.45359	1	= 0.37324
2	= 0.90718	2	= 0.74648
2.20462	= 1	2.67923	= 1
3	= 1.36078	3	= 1.11973
4	= 1.81437	4	= 1.49279
4.40924	= 2	5	= 1.86621
5	= 2.26796	5.35846	= 2
6	= 2.72155	6	= 2.23945
6.61387	= 3	7	= 2.61269
7	= 3.17515	8	= 2.98593
8	= 3.62874	8.03769	= 3
8.81849	= 4	9	= 3.35918
9	= 4.08233	10.71691	= 4
11.02311	= 5	13.39614	= 5
13.22773	= 6	16.07537	= 6
15.43236	= 7	18.75460	= 7
17.63698	= 8	21.43383	= 8
19.84160	= 9	24.11306	= 9





## INDEX

An endeavor has been made to make this index very complete in that articles are indexed under the principal words of the name and in addition under the author's name, thus, "Blair's Water Bath" will be found under "Bath, Water, Blair," "Water Bath, Blair" and "Blair Water Bath." As the authors' names are printed in heavy face type and in alphabetical sequence, the usual Authors' Index is omitted.

	Page		Page		Page
<b>A</b>		Agate Mortars.....	362	Anaerobic Culture Apparatus.....	8
<b>Abati</b> Drying Oven.....	375	Air Compressors.....	1 to 6	Anaesthetic Bottle and Air Warmer, Brodie.....	403
<b>Abbe</b> Apertometer.....	324	Air Liquefying Apparatus.....	285	Anaesthetizing Valves.....	403
" Camera Lucida, B. & L.....	316	Air Melting Point Oven.....	18	Analytical Balances.....	46 to 51
" " Zeiss.....	324	Air Pumps.....	1 to 6	Weights.....	62 to 64
" Condensers, B. & L.....	315	Air Pump Plates.....	6	Analyzer for Curves, Jaquet.....	408
" " Zeiss.....	320	" Receivers.....	71	" Micro Polarisation.....	317
" Microspectroscope.....	324	" Sampler.....	7	Anastigmatic Magnifiers, Zeiss.....	288
" Refractometer.....	466	" Tester, Wolpert.....	7	Anatomical Charts, Human, Lendenfeld.....	124
" Spectral Ocular.....	324	" Warmer and Anaesthetic Bottle.....	403	" Models.....	9
" Stereoscopic Ocular.....	324	Albuminometers.....	543	<b>Anderson</b> Petersen - Palmquist Gas Analysis Apparatus.....	249
<b>Abderhalden</b> Animal Cage.....	11	Alcohol Blast Burners, Barthel.....	95	Anemometers.....	10
" Apparatus for Dialyzing Method.....	177	" Burner.....	97	Aneroid Barometers.....	65
" Apparatus for Optical Method.....	428	" Lamps.....	283	Angle Thermometers.....	534
" Cylinder for Hydraulic Press.....	437	" Stoves, Barthel.....	278	Animal Balance.....	10
" Diffusion Shells.....	177	Alcoholometers (Hydrometers).....	465	" Bladders.....	73
" Electric Heating Device for Polariscopes.....	428	<b>Alexander</b> Glue and Gelatine Tester.....	261	" Board.....	10
" Flasks and Tubes.....	177	" Viscosity Pipette.....	261	" Cages.....	10, 11
" Polariscopes.....	428	Aliphatic Amino Group Apparatus, Van Slyke.....	367	" Holders.....	11, 12
" Tubes.....	428, 434	Alkalimeters.....	7	" Jars.....	11, 12
" Reagents.....	177	Alkalinity Flask, Volumetric.....	224	" Table, Brodie.....	12
" Test Tube.....	177	<b>Allen &amp; Moyer</b> Orsat Gas Analysis Apparatus.....	245	Annealing Cups.....	12
" Tongues.....	177	<b>Allihn</b> Condenser.....	152	Anodes, Platinum.....	420
" Water Bath.....	177	" Gas Washing Bottles.....	251	Anoxyscope.....	416
<b>Abel-Pensky</b> Flash Point Testers.....	368	" Normal Thermometers.....	532	<b>Anschütz</b> Normal Thermometers.....	532
Absorption Blocks.....	1	Alpha Ray Electroscope, Ruthenford.....	464	Antitoxin Culture Flask.....	171
" Cells for Spectroscopy.....	504	<b>Alsop</b> Drying Oven.....	380	Anvils.....	13
" Tube, Folin.....	543	Aluminum Beakers.....	68	Apertometer, Abbe.....	324
Accumulators.....	66, 67	" Dishes.....	180	Aplanatic Substage Condenser, B. & L.....	315
Acetometer, Otto.....	1	" Screen, Zeiss.....	448	" Substage Condenser, Zeiss.....	320
Acetylene Burner.....	92	" Shields for Centrifuge Tubes.....	115, 116	" Triplets.....	287
" Gas Tank.....	441	" Weighing Dish with Counterpoise.....	180	Apochromatic Objectives, Zeiss.....	321
Acetylation Flask.....	218	" Wire.....	554	Appliances, Measuring.....	290 to 296
Achromatic Objectives, Zeiss.....	321	<b>Alundum</b> Combustion Boats.....	149	Application Goniometer, Penfeld.....	352
" Substage Condensers, B. & L.....	315	" Tubes.....	149	Aprons.....	13
" Substage Condensers, Zeiss.....	320	" Crucibles.....	157, 160	" Asbestos.....	14
Acid Basins.....	1	" Dish for Incinerations.....	178	Aquaria.....	13
" Bottle and Pipette combined.....	350	" Extraction Thimbles.....	205	Arc Furnaces, Electric.....	241
" Burette for Milk Testing.....	350	" Filter Cones.....	213	" Lamp, Mercury Vapor, Heraeus.....	503
" Measure " ".....	350	" " Discs.....	212	" " for Microscopes.....	331
" Pitchers.....	1	" " Dish.....	213	" " " " Mercurvapor.....	332
" Pumps.....	1	" Filtering Crucibles.....	160	" " for Photo-Micrographic Apparatus.....	340
<b>Ackermann</b> Automatic Reckoner.....	351	" Muffles.....	364	" " " " Weule.....	340
Acme Safety Burners.....	92	" Pyrometer Tubes.....	458	" " for Projection Apparatus.....	447
<b>Adam</b> Galactometer.....	351	" Refractory Cement.....	149	Areo-Pycnometer, Saxe.....	273
Adapters for Retorts.....	1	" RR.....	149	<b>Argand</b> Burner.....	91
Adhesion Machine Kirchbraun-Sargent.....	15	" Tubes.....	7	Armored Thermometers.....	534
Adhesive Tape.....	75	<b>Amberg</b> Swimming Cups.....	515	<b>Arnold</b> Steam Sterilizers.....	41
Adiabatic Calorimeter, Riche.....	104	Ameters and Milliampeters.....	200 to 202	<b>Arons</b> Chromoscope.....	146
Adjustable Oculars, Zeiss.....	264	Ammonia Nitrogen and Urea in Urine, Folin's Apparatus for.....	543	<b>Arrhenius</b> Conductivity Cells.....	390
" Supports for Physiological Work.....	401, 402	" Still.....	190	<b>Arsem</b> Electric Vacuum Furnace.....	242
<b>Agar</b> Filter Paper.....	216	" Trap for Folin's Apparatus.....	543	Arsenic Apparatus.....	14
		Ampoules.....	96	" Tubes.....	14
		Ampoule Sealing Burner.....	96	Artery Canulae.....	402
				" Scissors.....	184

	Page		Page		Page
Artificial Respiration Pumps	402, 403	Balances	351	Battersea Roasting Dishes	475
Asbestos Aprons, Board, Cement, Cord, Gloves, Mats and Paper	14	"	54	"	481
"	554	"	59	Battery for Charging Electroscopes	460
Asphalt and Tar Testing Apparatus	15 to 19	"	250	"	68
"	273	"	58	"	68
"	534	"	58	"	271
Aspirator Bottles	75	"	54 to 56	Baume Hydrometers	271
Aspirator (Syringe)	519	"	57	Bausch & Lomb Micro-Photographic Apparatus	337 to 339
Assay Balances	52, 53	"	53	"	337 to 339
"	235	"	59, 61	"	304 to 317
"	156, 157	"	56, 57	"	331
"	218	"	56, 57	"	343 to 348
"	161	"	61	"	353 to 357
"	63	"	59, 60	"	448
Atomic Weight Charts	130	"	418	"	258
"	555	"	59	"	68
Atom Models	19	"	58	"	68
Atwater Bomb Calorimeter	105	"	60	"	69 to 71
"	175	"	418	"	69
Autoclave, Force, for Cement, for Chemical Digestions (Digesters)	111	"	59	"	71
"	20	"	58	"	68
"	37, 38	"	64	"	459
Autocollimation Spectroscope	500	"	64	"	142
"	251	"	61	"	212
Automatic Burettes	87, 88	"	64	"	212
"	343	"	64	"	389
"	412	"	64	"	502
"	344	"	64	"	533
"	351	"	64	"	423
"	474	"	64	"	433
"	338	"	62 to 64	"	71, 72
Auxograph	416	"	166	"	71, 72
Axial-angle Apparatus, Wulffing	353	"	65	"	384
		"	210	"	260
		"	250	"	289
		"	439	"	95
		"	76	"	273
		"	505	"	508
		"	180	"	210
		"	405	"	211
		"	405	"	532
		"	346	"	324
		"	273	"	253
		"	286	"	253
		"	313	"	464
		"	188	"	88
		"	65	"	216
		"	65	"	266
		"	260	"	68
		"	18	"	394
		"	98	"	72
		"	95	"	312
		"	1	"	330
		"	522	"	325
		"	431	"	10
		"	226		
		"	431		
		"	392, 393		
		"	43		
		"	480		
		"	34, 35		
		"	548 to 552		
		"	177		
		"	66		
		"	65, 66		
		"	66, 67		
		"	157		
		"	364		

	Page		Page		Page
Bitumen Holder	15	Bottles, Gas, Generating	250	Büchner Funnels	229
Bladders, Animal	73	"    Washing	250, 251	Hydraulic Press	437
Blair Drying Oven	379	"    Graduated	84	Buck Iron Mortar	362
"    Platinum Combustion		"    Hard Rubber	84	Bucket, for Waste	546
"    Boats	421	"    Immersion Oil	77	Bucking Board	161
"    Platinum Dish	422	"    Milk Testing	350	Bulbs, Connecting, Kjeldahl	366
"    Stirring Apparatus	509	"    Oil Sample	84	"    Levelling for Gas Bu-	
"    Water Bath	548	"    Mixing	173	rettes	251
Blake Pinning Forceps	227	"    Percolator	382	"    Nitrogen	366
Blast Blowers	73	"    Pressure	84	"    Resistance	453, 454
"    Burners	94 to 96	"    Reagent	80 to 83	"    Rubber	475, 476
Blocks for Absorption	1	"    Specific Gravity	491, 492	Bulb Connecting Tube for Mar-	
"    of Red Fibre	348	"    "    Barrett		shall Urea in Blood Appa-	
"    for Staining Jars	507	"    Hubbard	18	ratus	266
Block Strop for Microtome		"    Specimen	77	Bulls-Eye Condenser, B. & L.	317
Knives	348	"    for Sputum Specimens	506	Bumstead Electroscope	463
"    Tin Pipe	412	"    Washing	546	Bunsen Blast Burners	94
Blood Apparatus for Oxygen		"    Water Sample	84	"    Burners	91, 92
Capacity and Carbonic		"    Weighing	553	"    Clamps	140
Acid Content, Barcroft		"    Wouff.	84	"    Eudiometers	205
and Haldane	405	Bottle Caps	180	"    Funnels	228
Capsules, Wright	267	Bougies, Filtering	210	"    Gas Washing Bottles	250
Collector, Vacuum	267	Bowen Potash Bulb	436	Bunte Gas Burettes	251
Counting Apparatus	262 to 264	Bowls, Enamel Ware	180	Bureau of Mines Flash Point	
"    Gas Apparatus for Differ-		Boxes, Pasteboard	85	Testers	369
ential Pressure	405	"    Tin	85	Burettes	86 to 89
"    Lancets	267	"    Wood	85	"    for Acid in Milk Test	350
"    Pipette, Wright	267	"    for Culture Dishes	171	"    Automatic	87, 88
"    Pipettes for Haemacytom-		"    "    Filter Paper	216	"    Calibrating	88
eters	263	"    "    Micro Slides	335	"    Certified	89
"    Testing Apparatus	262 to 266	"    "    Paraffine Embedding	345	"    Dispensing	88
Blowers, Crowell Positive Pres-		"    "    Pipettes	415	"    Gas	251
sure	73	Boxwood Rule	90	"    Precision	89
"    Foot	73	Boyce Acme Safety Burner	92	"    Saponification	88
"    Pressure	73	Adjustable Burner	92	Burette Attachments	86
Blowpipes	74	Brain Jars	73	"    Caps	88
"    for Zoological Work	181	"    Knife	181	"    Clamps	141, 142
Blowpipe Charcoal	74	"    Microtome, Sartorius	345	"    Floats	88
"    Set, Butler	74	Brass Sieves	486, 487	"    Funnel	88
"    Tips, Platinum	422	"    Stopcocks	510	"    Meniscus Reader	88
Blowpiping Forceps	227	"    Wire	554	"    Supports	90
"    Mattresses	286	Braum Crushers	163, 164	Bürker Fluid Chamber	263
Blue Flame Burners	93	"    Planetary Pulverizers	163	"    Haemacytometer	262 to 264
"    Green Hones	348	"    Sample Grinders	162	Burner, Acetylene	92
Board, Asbestos	14	"    Sieve Shakers	487, 488	"    Acme Safety	92
Boas Dish for Feces Experi-		Brauer Haemacytometer	262 to 264	"    Adjustable	92
ments	177	Bridges, Slide Wire	393, 394	"    Alcohol	92
Boggs Coagulometer	266	Briqueite Mould for Asphalt	15	"    Arganol	92
Bohr Experimental Gas Meter	404	"    "    Cement	11	"    Barthel	95, 98
Boilers (Saucepans)	75	Brinell Hardness Tester	268	"    Blast	94 to 96
Boiler, Steam	508	"    "    Test Measur-		"    Blue Flame	92
Boiling Flasks	219, 220	"    ing Micro-		"    Boyce	92
Boiling Point Apparatus	389	"    scope	295	"    Bunsen	91, 92
"    Tubes	389	Brinton-Reischauer Specific		"    Chaddock	92
Bolting Cloth	75	Gravity		"    Combustion Tube	92
Bone Saw	182	"    Bottle	491	"    Dangler	92
"    Spatulas	490	Brix Hydrometer	271	"    Detroit	92
"    Spoons	506	Brodie Anaesthetic Bottle and		"    Eureka	92
Book of Labels	283	"    Air Warmer	403	"    Evaporating	96
Boot Specific Gravity Bottle	491	"    Animal Table	12	"    Fletcher Radial	92
Borer, Soil	490	"    Kymograph	398	"    "    Safety	92
Borrel Grinding Apparatus for		"    Respiration Pump	402	"	
Organic Tissues	169	Brodie-Russell-Boggs Coagu-		"    (Gas Stoves)	92
Boston Slide Forceps	228	lometer	266	"    Gauze Top	92
Botanical Charts	126 to 129	Bromwell Fusel Oil Apparatus	245	"    Greenman	92
"    Supplies	75	Brown Assayer's Combination		"    High Temperature	92
Böttcher Counting Apparatus	156	"    Furnace	235	"    Hydro Carbon for Kero-	
Bottles	78, 79	"    Pyrometers	450	"    sene	92
"    Aspirator	75, 76	Brownite Cupels	172	"    Janus Blast	92
"    Balsam	76	Brücke Combination Lens	288	"    Koch Safety	92
"    Cedar Oil	77	Bruehl Receiver	465	"    Low Temperature	92
"    Dropping	76, 77	Bruneau Syringes	518	"    Micro	92
"    Ether	84	Brushes	85, 86	"    Multiple Tube	92
"    Gas, Cubic Foot	255	"    for Cement	114	"    Pilot Light	92



	Page		Page		Page
<b>Burner</b> Ring Form.....	94	Carbonic Acid Content of Blood		Chloride Calcium Cylinders.....	99
“ “ “ for tar Test-		Apparatus, Barcroft		“ “ Tubes.....	99, 100
ing.....	18	and Haldane.....	405	Chopper, Meat.....	297
“ Sargent High Tempera-		Carbonic Acid Determination		Chromophotometer, Plesch.....	147
ture.....	93	Apparatus.....	99	Chromo-Saccharometer.....	543
“ Seimateco Patent.....	93	“ Acid Flask.....	218	Chronograph, Thury.....	139
“ Spectrum.....	502	Carbons for Arc Lamps.....	448	Chronometers, Graphic, Jaquet	400
“ Teclu.....	93	Carboy Inclinator.....	110	Chromoscope, Arons.....	146
“ Tirrill.....	92	“ Stopper.....	110	Chromoscopes.....	139
“ Universal.....	92	Cardiographic Apparatus.....	403 to 411	<b>Chun</b> Binocular Microscope.....	330
“ Attachments.....	94	Cardioid Condenser Ultra-Mi-		Circulation, Apparatus for the	
“ Guard.....	94	roscope, Zeiss.....	329	Graphic Study of.....	405 to 411
<b>Burrell</b> Gas Analysis Apparatus.....	247	<b>Carius</b> Explosion Furnace.....	236	<b>Claisen</b> Distillation Flask.....	222
<b>Busz</b> Rhombohedron.....	358	<b>Carlitzek</b> Wire Gauze.....	554	Clamps.....	140 to 143
<b>Butler</b> Blowpipe Set.....	74	Carnotite, Standardized.....	460	“ “ for Microtomes.....	346
Butter Refractometer.....	466	<b>Carr</b> Vacuum Oven.....	379	“ “ “ Zabriskie.....	344
Button Pliers.....	423	Cartilage Knife.....	181	“ “ “ Microtome Knives.....	347
<b>Buxton-Beebe-Taylor</b> Drying		“ “ Shears.....	184	Clamp Holders.....	140
Apparatus.....	194	<b>Case</b> Patent Crusher.....	162	<b>Classen</b> Platinum Dish for	
		Cases for Dissecting Instru-		Electrolytic Separation.....	422
		ments.....	184	“ “ Swivel Board and Work	
		“ “ Gas Collecting Tubes	251	Table for Quantita-	
		“ “ Polariscopes.....	427, 432	tive Electrolysis.....	196
		Casserole, Porcelain.....	110	Clay Combustion Boats.....	149
		“ Silica.....	110	“ “ Tubes.....	149
		<b>Cassia</b> Flask.....	224	Cleaning Apparatus for Test	
		Cathetometers.....	296	Tubes.....	522
		Cathodes, Platinum.....	420	Cleveland Fire Tester.....	368
		Cedar Oil Bottles.....	77	Clinical and Physiological Ap-	
		Cells for Calomel Normal Elec-		paratus.....	398 to 411
		trodes.....	396	“ Thermometers for Veter-	
		“ Conductivity.....	390, 391	inary Use.....	535
		“ for Gas Electrodes.....	396	Clinostat.....	416
		“ “ Half Elements.....	396	Clock, Center Seconds.....	511
		“ Micro Slides.....	335	“ Thayer Interval Timer.....	143
		“ Porous.....	172	Closets, Glass, for Drying.....	194
		“ Selenium.....	481, 482	Cloth, Emery.....	205
		“ Spectrum.....	504	“ Counting Glasses.....	288
		“ Weston Standard.....	396	“ Testing Balances.....	529
		Cellular Incubator, Hearson.....	33	“ “ and Leather Tester,	
		Celluloid Rule.....	290	Schopper.....	525
		Cellulose Rings for Anaerobic		Coagulometers.....	266
		Culture Apparatus.....	8	Coagulators for Blood Serum	32, 34
		Cement, Asbestos.....	14	<b>Coddington</b> Magnifiers.....	287
		“ Refractory, Alundum.....	7	Coils, Induction.....	275
		“ “ Vulcan.....		Cold Closets.....	45
		“ “ Paste.....	110	Collecting Case, Botanical.....	75
		“ Sieves.....	487	“ “ “ “ Tubes for Blood.....	267
		“ Testing Apparatus.....	111 to 114	“ “ “ “ “ Gas.....	251
		Cementation and Ductility Ma-		“ “ “ “ “ Petrological.....	361
		chine, Kirchbraun.....	15	“ “ “ “ “ “ Balloons.....	65
		Centrifuges and Accessories.....	115 to 123	Colony Counting Apparatus.....	155
		Centrifuge Tube Support.....	524	Colorimeters.....	145 to 148
		Certified Burettes.....	50	Color Comparison Tubes.....	143
		“ Pipettes.....	414	“ “ “ “ “ Tube Cam-	
		<b>Chaddock</b> Burner.....	92	era.....	144
		“ Burette Support.....	90	“ “ “ “ “ “ Tester, Zeiss.....	147
		“ Clamps.....	142	“ “ “ “ “ “ Testing Apparatus	143 to 148
		<b>Chamberland</b> Culture Flasks.....	172	“ “ “ “ “ “ and Turbidity Determin-	
		<b>Chamberland-Pasteur</b> Pressure		ing Apparatus.....	542
		Filter.....	211	Combined Drawing, Micro-Pho-	
		Chambers, Moist.....	170	tographic and Pro-	
		<b>Chamot</b> Chemical Microscope.....	313	jection Apparatus.....	339
		<b>Chapman</b> Filter Pumps.....	217	Combination Magnifiers, Zeiss.....	288
		Charcoal, for Blowpiping.....	74	Combustion Boats.....	149
		<b>Chardin</b> Filter Paper.....	216	“ “ “ “ “ “ Platinum.....	421
		Charging Rod for Electroscopes	462	“ “ “ “ “ “ Capsules.....	149
		Charts.....	124 to 139	“ “ “ “ “ “ Furnace, Fletcher.....	235
		Chemical Microscope, Bausch &		“ “ “ “ “ “ Glaser.....	236
		Lomb.....	313	“ “ “ “ “ “ Heraeus.....	238
		Chemical Technology Charts	129, 130		
		<b>Chew</b> Ductility Machine.....	16		
		Chipmunk Crushers.....	164		

	Page		Page		Page
Combustion Furnace, Heraeus-Dennstedt.....	239	Contact Keys.....	395	Crushing, Grinding and Pulverizing Apparatus 161 to 169	169
“ “ Hoskins.....	237	“ DuBois-Reymond.....	402	Cryoscopes.....	169
“ “ von Babo.....	236	Control Tube for Polariscopes.....	435	Crystal Axes Models.....	358
Erlenmeyer.....	236	Convertible Balopticon.....	444	“ Models.....	359, 360
“ Train, Vanier.....	150	<b>Coplin</b> Object Clamp for Microtomes.....	346	“ Modeling Apparatus, Goldschmidt.....	352
“ Tubes.....	149	“ Paraffine Embedding.....	43	Crystallizing Dishes.....	177
“ “ Platinum.....	421	“ Staining Jar.....	507	Crystallographic, Mineralogical and Petrographical Apparatus 352 to 361	361
“ “ (Test Tubes).....	520	Copper Analysis, Herman Electrolytic Outfit for.....	197	“ Microscope, Zeiss.....	330
“ Tube Burner.....	94	“ Beakers.....	68	Crystallography, Charts of.....	133
“ Tubing, Glass.....	260	“ Crucibles.....	159	Cube Moulds, for Cement.....	111
Commutator, Mercury.....	395	“ Determination Flask.....	218	Cubic Foot Gas Bottles.....	235
“ Pohl.....	402	“ Flasks.....	220	Culture Apparatus, Anaerobic.....	8
Comparators.....	292, 293	“ “ for Moisture Test.....	222	“ Dishes.....	170
Comparison Spectroscope, Zeiss.....	501	“ Funnels.....	229	“ Dish Holders.....	171
“ Tubes, Color.....	143	“ Oxide Flasks.....	220	“ Flasks.....	171, 172
Compartment Incubators 29, 30, 33	33	“ Tank for Distilled Water.....	512	“ Slides.....	334, 335
Compensation Apparatus (Potentiometer) Fischer, for Cathode Potentials.....	199	“ Wire.....	554	“ Tubes.....	172, 520, 521
Compound Blast Burner.....	95	Cord, Asbestos.....	14	“ Tube Baskets.....	522
Compression Pumps for Gases.....	151	Corks.....	154	Cupels.....	172
Compressors, Air.....	1 to 6	“ Rubber.....	177, 478	Cupel Mould.....	172
Compressor for Liquid Air.....	285	Cork Borers.....	154	“ Rake.....	172
Compressors, Screw, for Rubber Tubing.....	142	“ Borer Sharpener.....	154, 155	“ Shovel.....	172
Concave Slides.....	334, 335	“ Extractor.....	155	“ Tongs.....	539
Concentric Rings.....	475	“ Knife.....	282	Cups, Annealing.....	13
Condensers.....	152	“ Press.....	155	“ Drop.....	173
Condenser, Bulls-Eye.....	317	“ Screws.....	155	“ or Cells, Porous.....	172
“ Kjeldahl.....	364	“ Tongs.....	155	“ Swimming.....	515
“ Substage, B. & L.....	315	<b>Cornet</b> Cover Glass Forceps.....	228	<b>Curie</b> Electroscopie and Accessories.....	461, 462
“ Zeiss.....	320	Coronary Artery Scissors.....	184	Curve Analyzer, Jaquet.....	408
“ Tar Testing.....	18	Cornu Prisms.....	504	Cutter, Bagasse.....	297
Condenser Flask for Micro Lamps.....	332	<b>Cottle</b> Extraction Apparatus.....	207	“ Glass.....	258
“ Supports.....	153	Counter Balances.....	59	“ “ Tubing.....	258
“ Trough, for Tar Testing.....	18	Counters, Thread.....	288	Cyclone Centrifuges.....	120
“ Tube for Urea, Folin.....	543	Counterpoised Watch Glasses.....	547	Cylinders, Calcium Chloride.....	99
“ Tubes.....	152	Countershafts for Motors.....	363	“ Filtering.....	210
Conditioning Ovens.....	528, 529	Counting Apparatus for Bacteria.....	155	“ Gas, for CO <sub>2</sub> , Oxygen, etc.....	252
Conductivity of Electrolytes, Apparatus and Accessories 390 to 394	394	“ “ “ Blood.....	262	“ Glass.....	173
“ Cells.....	390, 391	“ Chambers.....	262	“ Graduated Precision.....	174
“ Vessel Clamp.....	143	“ Pipette for Bacteria in Milk.....	413	“ for Hydraulic Presses.....	437
“ “ Support.....	515	Couplings for Filter Pumps.....	217	“ Immunity Unit.....	174
Cones, Filtering, Alundum.....	213	Cover for Balances.....	64	“ Mixing.....	173
“ “ S. & S. Paper.....	215	“ Earthenware, for Petri Dishes.....	170	“ “ Precision.....	174
“ “ Platinum.....	421	“ and Receiver for Sieves.....	486	“ for Moisture Tester.....	173
“ Measuring.....	291	“ Glasses for Haemacytometers.....	263	“ Testing Sewage.....	173
“ Pyrometric.....	458	“ Glasses Micro.....	334	Cylindrical Shelf for Pneumatic Troughs.....	423
Configuration Atom Models.....	19	“ “ for Polariscopes.....	435	Cytology and Haematology, Charts of.....	131
Conical Glasses.....	520	“ Glass Forceps.....	227, 228		
Connecting Bulbs, Kjeldahl.....	366	“ “ Gauge.....	292		
“ Tube for Gas Burettes.....	251	Creamometers.....	348		
“ Tubes for Marshall Urea in Blood Apparatus.....	266	Cream Test Balance.....	351		
Connectors, for Batteries.....	68	“ “ Bottles.....	350	<b>D</b>	
“ “ Stopecks.....	510	Creosote Sulphonation Test Funnel.....	231	Dairy Thermometer.....	535
Consistency Meter.....	261	<b>Crowell</b> Positive Pressure Blow-er.....	73	<b>Daland</b> Haematokrit.....	115
Constant Deviation Spectrometer.....	495	“ Rotary Air Pumps.....	5, 6	<b>Dalen-Martens</b> Rubber Tester.....	527
Constant Temperature Bath, Freas.....	393	Crucibles, Assay.....	156, 157	Dam, Rubber.....	478
Constant Temperature Bath, Oswald.....	392	“ Platinum.....	421	<b>Dangler</b> Gasoline Burner.....	97
Constant Temperature Bath, for Microscopes.....	333	“ Porcelain.....	158, 159	<b>Dare</b> Haemoglobinometer.....	265
		“ “ for Asphalt.....	15	Dark Field Condensers, B. & L.....	315
		“ Transparent Quartz.....	459	“ “ Zeiss.....	320
		Crucible Furnace Fletcher.....	234	Decimal Balances.....	54
		“ “ Hoskins.....	239	Decimeter Rule.....	290
		“ Holders.....	160, 161	Decomposition of Water Apparatus.....	263, 284
		“ Tongs.....	538, 539	Deflagration Spoons.....	174
		“ Tubing, Rubber.....	480	Dehydrator, Hearnson, for Continuous Drying of Tissues in Alcohol.....	44

	Page		Page		Page
<b>Delepine Centrifuge</b> .....	123	Dishes, Lead.....	180	<b>Drying Apparatus for Serum</b> , etc.....	193
<b>Demijohns</b> .....	175	“ Nickel.....	180	“ Closets, Glass.....	194
<b>Demonstration Ammeters, Gal-</b> <b>vanometers and</b> <b>Voltmeters</b> .....	200	“ Platinum.....	421, 422	“ Ovens.....	374 to 381
“ Microscope, B. & L.....	311	“ Preparation.....	180	“ Oven for Asphalt Test-	15
<b>Demonstrating Ocular, Double</b> <b>Dennis-Orsat Gas Analysis Ap-</b> <b>paratus</b> .....	333	“ Roasting, Battersea.....	475	“ Paper, Botanical.....	75
<b>Dennison Labels</b> .....	245	“ Silver.....	506, 507	“ Tubes.....	193
<b>Dennstedt Furnace for Eleme-</b> <b>ntary Organic Analysis</b> <b>Densitometers</b> .....	282, 283	“ Sputum.....	507	“ Calcium Chlo-	99, 100
<b>Dental Dam</b> .....	478	“ Staining.....	507	“ Chloride.....	100
<b>Denver Fire Clay Crucibles</b> <b>Deprez Signal Marker</b> .....	156	“ Tin Foil.....	180	<b>Drying Tube and Potash Bulb</b> <b>Combined, Vanier</b> .....	193
<b>Dermatoscope, Zeiss</b> .....	325	“ Transparent Quartz.....	459	<b>DuBois-Reymond Contact</b> “ Key.....	395, 402
<b>Desiccators</b> .....	175, 176	“ Weighing.....	180	“ Inducturium.....	402
<b>Desiccator Plates</b> .....	175	<b>Dish Clamps</b> .....	142	<b>Duboseq Colorimeters</b> .....	145
<b>Despatch Electric Drying Ovens</b> <b>Detroit Burner</b> .....	378	<b>Dispensing Balance</b> .....	59	<b>Ductility Machine, Chew</b> .....	16
<b>Dewar Vacuum Flasks</b> .....	224	“ Burette.....	88	“ Kirchbraun.....	15
<b>Dialyzers</b> .....	176	<b>Dissecting Instruments</b> .....	181 to 185	“ Smith.....	16
<b>Dialyzer Tubing</b> .....	176	“ Microscopes, B. & L.....	311	<b>Dudley Sulphur Apparatus</b> .....	512
“ Filter Paper, Moro- chowetz.....	216	“ Meyer.....	327	“ Viscosity Pipette.....	370
<b>Dialyzing Method, Abderhal-</b> <b>den, Apparatus for</b> .....	177	“ Mag- nifiers.....	287	<b>Dujardin-Salleron Ebullimeter</b> <b>Dulin Rotarex</b> .....	194
<b>Dialyzing Paper</b> .....	382	“ Pan.....	538	<b>Dunning Colorimeter</b> .....	144
“ Thimbles.....	176	<b>Distillation Flasks</b> .....	222	<b>Duplex Slide Rule</b> .....	489
“ Abder- halden.....	177	<b>Distilled Water Storage Tanks</b> <b>Distilling Apparatus</b> .....	511 to 512	<b>Dupont Nitrometer</b> .....	367
<b>Diamond, Writing</b> .....	176	“ Kjeldahl.....	364	<b>Dye Baths</b> .....	551
<b>Diamond Glass Cutter</b> .....	258	“ for Mer- cury, Hu- lett.....	297	“ Pots.....	68
“ Ink.....	275	“ for Miner- al Oils.....	373		
“ Mortars.....	362	“ Vacuum 190 to 192			
<b>Diazo Reaction Glass, Ehrlich</b> <b>Dichroscopes</b> .....	543	“ Tubes.....	191	<b>E</b>	
<b>Dielectric Constant Apparatus</b> <b>and Accessories</b> .....	390 to 394	“ Tube, Hempel.....	19	<b>Earthenware Covers for Petri</b> <b>Dishes</b> .....	170
<b>Differential Manometer, König</b> “ Pressure of Blood Gases Apparatus, Barcroft and Rob- erts.....	290	<b>Distributors for Gas</b> .....	254	“ Tiles.....	538
<b>Diffusion Shells</b> .....	176	<b>Dixon's Plumbago Crucibles</b> <b>Dodge Photographic Register</b> <b>Dolezalek Electrometer</b> .....	157	<b>Ebullimeter, Dujardin-Salleron</b> <b>Edelmann Electro-Cardiograph</b> Outfit and Accessor- ies.....	194
<b>Digesters</b> .....	20	<b>Dönnitz-Hartmann Charts of</b> <b>Parasitic Protozoa and their</b> <b>Carriers</b> .....	409	“ Einthoven String Galvanometer.....	409
<b>Digesting Shelf, Kjeldahl</b> .....	364	<b>Doolittle Torsion Viscosimeter</b> <b>Doremus Ureometers</b> .....	131	<b>Edison Primary Batteries</b> .....	65
<b>Dionie Water Tester</b> .....	553	<b>Doremus-Hinds Ureometers</b> .....	371	<b>Eggertz Color Comparison</b> <b>Tubes</b> .....	143
<b>Dipping Refractometer</b> .....	467	<b>Dorn-Goetze Spectrum Tubes</b> <b>Double Demonstrating Ocular</b> “ Hooks.....	505	<b>Ehrlich Cover Glass Forceps</b> “ Adjustable Ocular.....	227
<b>Direct Vision Spectroscopes</b> .....	492	<b>Double Demonstrating Ocular</b> “ Walled Funnels.....	333	“ Ocular Diaphragm for Blood Counting.....	265
<b>Discs, Filter, of Alundum</b> .....	212	<b>Doublet Magnifiers</b> .....	287	“ Diazo Reaction Glass.....	543
“ Rubber, for Foot Blow- ers.....	73	<b>Draft Gauge, Seger</b> .....	290	“ Pipettes.....	415
“ Ultrafilter, Bechhold.....	212	<b>Drawing Apparatus for the Mi-</b> <b>croscope, B. &amp; L.</b> .....	317	<b>Eiloart Atom Models</b> .....	19
<b>Dishes</b> .....	177 to 180	“ Board, B. & L.....	316	<b>Einhorn Fermentation Saccha-</b> <b>rometer</b> .....	544
“ Aluminum.....	180	“ Table, Bernhard.....	324	<b>Einthoven String Galvanometer</b> “ Edelmann.....	409
“ Alundum, for Incinerat- ions.....	178	“ Micro-Photographic and Projection Ap- paratus, Combined, Bausch & Lomb.....	339	“ String Galvanometer Cam-Scientific Inst. Co.....	410
“ Boas, for Feces Experi- ments.....	177	<b>Drechsel Gas Washing Bottles</b> <b>Dressing Jars</b> .....	250	<b>Electric Arc Furnaces</b> .....	240
“ Crystallizing.....	177	<b>Dreverhoff Filter Paper</b> .....	216	“ Lamps for Micro- scopes.....	331
“ Culture.....	170	<b>Drops, Prince Rupert</b> .....	480	“ Dessiccator.....	176
“ Enamel Ware.....	180	<b>Drop Culture Slides</b> .....	334, 335	“ Drying Ovens.....	376
“ Evaporating, Glass.....	179	“ Cups.....	173	“ Flask Heaters.....	227
“ Nickel, for Tar Test- ing.....	18	<b>Dropping Bottles</b> .....	76, 77	“ Furnaces, Hos- kins.....	237, 239, 240
“ Porcelain.....	178	“ Funnel.....	231	“ Northrup.....	243
“ Silica.....	179	“ Pipettes.....	412	“ Furnace Temperature Regulator, Thwing.....	237
“ Filtering, Alundum.....	213	<b>Drucker Cadmium Normal Ele-</b> <b>ment</b> .....	396	“ Heater for Milk Testers Hot Plates.....	350
“ Incinerating Alundum.....	178	“ Calomel Normal Elec- trodes.....	396	“ Illuminating Device for Polariscopes.....	432
“ Iron.....	180	“ Viscosity Tubes.....	397	“ Motors.....	363
		<b>Drucker-Burrian Cryoscope</b> <b>Drug Mills</b> .....	169	“ Thermo-Regulators.....	537
		<b>Drüner Stereoscopic Camera</b> <b>Dry Batteries</b> .....	326		



	Page		Page		Page
Electric Vacuum Furnace, Arsem.....	242	Engler Apparatus for Distillation of Mineral Oils.....	373	Fibre Blocks.....	348
“ Water Baths.....	550, 551	“ Distillation Flasks.....	222	Field Glasses, Bausch & Lomb.....	72
Electro-Cardiographic Outfit, Cambridge Scientific Inst. Co.....	410	“ Viscosimeters.....	371, 372	Figures of Steel for Stamping.....	209
Electro-Cardiograph Outfit and Accessories, Edelmann.....	409	“ Viscosimeter Flasks.....	373	Filar Micrometer, B. & L.....	316
Electro-Chemistry Apparatus, including Rheostats, Voltmeters and Ammeters.....	195 to 204	Engravers Glasses.....	287	Files.....	209
(For Storage Batteries see p. 66.)		Enlarging Outfit for Lantern Slides.....	439	File Handles.....	209
Electrodes, Calomel Normal.....	396	Erdmann Burette Float.....	88	Filling Attachment for Test Tubes.....	522
“ Immersion.....	391	Erdmenger-Mann Volumometer.....	114	Filters, Berkefeld.....	210
“ Metal for Half Elements.....	396	Erlenmeyer Flasks.....	221	“ Gas.....	254
“ Net, of Nickel, Fischer.....	199	Errera and Laurent Plant Physiology Charts.....	129	“ Light, Wratten & Wainwright, for Micro-Photography.....	342
“ Platinum.....	396, 420	Esbach Albuminometers.....	543	“ Maassen.....	210
“ Unpolarizable.....	402	Esbach-Schelenz Albuminometer.....	543	“ Pasteur-Chamberland.....	210
Electrode Cells, Ostwald.....	396	Esmarch Water Sampling Apparatus.....	553	“ Pukal.....	210
Electrolysis in Magnetic Field, Apparatus for.....	200	Ether Bottles.....	84	“ Ray, for Spectroscopy.....	503
Electrolytic Analysis Switch Boards.....	195 to 198	“ Distillation Flask Heater.....	227	Filter Apparatus.....	213
“ Gas Generator for Oxygen and Hydrogen.....	254	“ Hydrometer.....	273	“ Bags.....	211
“ Stirring Apparatus, Fischer.....	199	Eudiometers.....	205	“ Cones, Alundum.....	213
“ Supports.....	199	Eureka Burner.....	96	“ Paper, S. & S.....	215
Electrometer, Capillary.....	395	Evaporating Burner.....	94	“ Platinum.....	421
“ Dolzalek.....	463	“ Dishes, Glass.....	179	“ Crucibles.....	160
“ Schmidt.....	462	“ Nickel, for Tar Testing.....	18	“ Discs, Alundum.....	212
Electrometer Key.....	395	“ Porcelain.....	178	“ Dish, Alundum.....	213
Electro-motive Force by the Potentiometer Method, Apparatus for.....	395	“ Silica.....	179	“ Flasks.....	223
Electroscopes for Radio-Chemistry.....	460 to 464	Ewald Chronoscope.....	139	“ Paper.....	213 to 216
Elements, Cadmium Normal.....	396	Excelsior Mill.....	165	“ for Agar.....	216
“ Chart of, Mendeleeff.....	130	Expansion Capsules for Thermometers.....	537	“ Blocks for Absorption.....	1
“ “ “ with their Atomic Weights.....	130	“ Pyrometers.....	450	“ Box.....	216
“ Half, for Physical Chemistry.....	396	Explosion Furnace, Carius.....	236	“ Presses.....	217
“ Heraeus for Pyrometers.....	451	Extension Clamps.....	140	“ Pumps.....	217
Elliott Fire Tester.....	368	Extraction Apparatus.....	206 to 208	“ for both Suction and Pressure.....	218
Emanation Electrometer, Schmidt.....	462	“ Barrett Cottle.....	18	“ Racks.....	216
“ Electroscopes, Ruthenford.....	464	“ Supports with Heaters.....	207, 208	“ Tubes.....	218
Embedding Apparatus for Vacuum.....	43	“ Flasks.....	205	“ Tube for Gases.....	254
“ Box.....	348	“ Thimbles.....	205	Finder, Maltwood.....	324
“ Ovens, Paraffine.....	348	“ Tubes.....	205	Finger Cots, Rubber.....	476
“ Table.....	348	“ Tube, Fat, Rohrig.....	351	Fiolax Glass Test Tubes.....	520
Embryological Incubator, Hearson, Electric.....	29	Extractor for Bituminous Mixtures.....	16	“ Tubing.....	260
“ Watch Glasses.....	547	Extractor for Bituminous Mixtures—Dulin Rotarex.....	17	Fire Testers.....	368
Emerson Conditioning Oven.....	529			Fischer Double Net Electrode.....	199
“ Fuel Calorimeter.....	103	<b>F</b>		“ Electrolytic Supports.....	198
“ Razor Strop.....	348	Factor Weight for use with Vanier Combustion Train.....	150	“ Glass Stirrer.....	199
Emery Cloth.....	205	Fairbanks Testing Machines for Cement.....	112	“ Micro Polariscope.....	429
“ Paper.....	205	Faraday's Law Demonstration Apparatus.....	195	“ Tube.....	434
Enamel Ware Beakers.....	68	Faraday Washing Bottle.....	546	“ Potentiometer.....	199
“ Dishes.....	180	Fat Extraction Tube, Rohrig.....	351	“ Speed Counter.....	199
“ Funnel.....	229	Faust-Heim Drying Apparatus.....	194	“ Stiring Apparatus.....	509
“ Graduate.....	262	Femel Patent Stills.....	189	Fischer-Fresenius Electrolytic Support.....	198
“ Trays.....	538	Fermentation Saccharometer.....	544	Fittings for Wash Bottles.....	546
“ Waste Pail.....	546	“ Tubes.....	209	Flash Point Testers.....	368 to 370
Engelmann Microspectral Objective.....	324	“ Tube Supports.....	209, 524	Flasks.....	218 to 226
		Fernbach Antitoxin Flask.....	171	“ Abderhalden.....	177
		Féry Refractometer.....	473	“ Acetylation.....	218
		“ Thermo-electric Calorimeter.....	106	“ Assay.....	218
		Feser Lactoscope.....	349	“ Boiling.....	219, 220
				“ Carbonic Acid.....	218
				“ Cassia.....	224
				“ Copper.....	220
				“ for Copper Determinations.....	218
				“ for Copper Oxide Determinations.....	220
				“ Culture.....	171, 172
				“ Distillation.....	222
				“ Engler, for Viscosimeters.....	373
				“ Erlenmeyer.....	221
				“ Extraction.....	205
				“ Filtering.....	223



<b>Plasks for Iodine Determinations.</b>	Page 220	<b>Freas Electric Sterilizers.</b>	Page 40	<b>Fused Rock Crystal Apparatus.</b>	Page 459
" Joliet.....	218	" " Tube Furnace.....	236	<b>Fusel Oil Apparatus.....</b>	245
" Kjeldahl.....	223, 224	" " Vacuum Oven.....	379	<b>Fuses for Projection Apparatus</b>	448
" Moisture Test.....	227	<b>Freezing Attachment for Micro-</b>			
" Silica.....	219	<b>trotomes.....</b>	346		
" for Soil Analysis.....	218	" Microtome, Bardenheer.....	346		
" Sugar.....	226	" " Sartorius.....	345		
" for Sulphur Determinations.....	218	" Tubes for Molecular Weight Determination Apparatus.....	389		
" Transparent Quartz.....	239	<b>Fresenius Arsenic Apparatus.....</b>	14		
" Vacuum, Dewar.....	224	" Desiccator.....	175		
" Volumetric.....	224 to 226	" Nitrogen Bulb.....	366		
" Precision.....	225	<b>Freudenreich Chemical Glass Flasks.....</b>	171		
" for Wash Bottles.....	219	<b>Friedberger-Kanten Metal</b>			
<b>Flask Condenser for Micro Lamps.....</b>	332	<b>Culture Dishes.....</b>	170		
" Heaters.....	227, 541	" <b>Cryptal Cryoscope.....</b>	169		
" Heater with Hot Plate.....	270	<b>Friedrichs Condensers.....</b>	153		
" Holders for Ostwald Thermometers.....	592	" Double Automatic Pipette.....	412		
<b>Fleisch Electrodes.....</b>	402	" Gas Washing Bottle.....	250		
<b>Fleischl Haemometer.....</b>	265	" Frigo Cold Closets.....	45		
<b>Fleischl-Miescher Haemometer.....</b>	266	<b>Fruehling and Schultz Desiccators.....</b>	175		
<b>Fletcher Combustion Furnaces.....</b>	235	<b>Fuchs-Rosenthal Counting Apparatus.....</b>	263		
" Crucible Furnaces.....	234	<b>Fuess Monochromator.....</b>	500		
" Muffle Furnaces.....	235	" Spectrograph.....	497		
" Radial Burner.....	93	<b>Time Absorption Tube, Folin</b>	343		
" Safety Burner.....	93	<b>Funnels.....</b>	228 to 230		
" Solid Flame Burner.....	98	" for Burettes.....	88		
" Water Heater.....	552	" Copper.....	229		
<b>Flexible Copper Tubing for Burner Connections.....</b>	98	" Double Walled.....	229		
<b>Flicker Photometer Sight-box.....</b>	384	" Enamel Ware.....	230		
<b>Floats for Burettes.....</b>	88	" Hot Air.....	230		
<b>Flow Plate and Mould, Asphalt Focusing Glass.....</b>	342	" Water.....	230		
<b>Foil, Platinum.....</b>	420	" Porcelain.....	229		
<b>Folded Filters, S. &amp; S.....</b>	215	" Rubber.....	552		
<b>Folding Rules.....</b>	290	" Sedgewick-Rafter Separator.....	230		
" Test Machine for Paper.....	526	" " for Creosote.....	19		
<b>Folin Apparatus for Nitrogen, Urea and Ammonia in Urine.....</b>	543	" " Water in Tar.....	18		
" Modification of Kjeldahl Apparatus.....	365	<b>Funnel Attachment for Filling Test Tubes.....</b>	231		
" Tube for Marshall Urea in Blood Apparatus.....	266	" Flasks for Filtering.....	223		
<b>Foot Blowers.....</b>	73	" Plates of Porcelain Supports.....	419		
<b>Force Autoclave.....</b>	111	" Tubes.....	232		
<b>Forceps.....</b>	227	<b>Furnaces.....</b>	232 to 244		
" Artery.....	181	" Assayers Combination, Brown.....	235		
" Blow-piping.....	227	" Combustion, Fletcher.....	235		
" Bone Cutting.....	181	" Glaser.....	236		
" Cover Glass.....	227	" Hoskins.....	237		
" Dissecting.....	181	" von Ba-bo-Erlenmeyer.....	236		
" Pinning.....	227	" Crucible, Fletcher.....	234		
" Platinum Tipped.....	227	" Hoskins.....	239		
" Slide.....	228	" Electric Arc.....	241		
<b>Foster Fire Tester.....</b>	368	" Vacuum, Arsem.....	242		
<b>Fraas Paleontological Charts.....</b>	133	" for Elementary Organic Analysis, Heraeus-Dennstedt.....	239		
<b>Fractional Distillation Tubes.....</b>	191	" Explosion, Carius.....	236		
" Weights.....	64	" High Temperature, Northrup.....	243		
<b>Frank Rubber Viscosimeter.....</b>	480	" Muffle, Fletcher.....	235		
<b>Frank and Tschirch Plant Physiology Charts.....</b>	128	" Hoskins.....	240		
<b>Fraunhofer Micrometer Microscope.....</b>	292	" Wiesnegg.....	235		
<b>Freas Constant Temperature Bath.....</b>	393	" Tube, Freas.....	236		
" Electric Drying Ovens.....	377				
" Incubators.....	27				
" Shaking Apparatus.....	485				

	Page		Page		Page
Gas Meter, Experimental, Bohr	404	Gas Tubing Cutter	258	Hand Balance	58
" Micro Lamps	331	" " Gauge	258	" Magnifiers	286 to 289
" Pipettes	256, 257	" " -Micrometer	292	" Microtome, B. & L.	346
" Pressure Regulator for Junker Gas Calorimeter	108	" Wool	261	" Spectrophotometer, Nutting	501
" Pressure Regulator for Pressure Cylinders	252	Glasses, Micro Cover	334	Handles for files	209
" Pressure Regulator for Thermo-regulators	537	" Pick	288	Handle for Zeiss Anastigmatic Magnifiers	289
" Regulator	256	" Reading	288	Harcourt Pentane Lamp	256
" Specific Gravity Apparatus, Schilling	256	Glazed Paper	382	Hard Rubber Bottles	84
" Stoves	97	" " for Kymographs	398, 399	" " Funnels	229
" Tongs	423	<b>Glinsky</b> Distilling Tube	191	" " Stopcock	510
" Washing Bottles	250, 251	Gloves, Asbestos	14	Hardness Testers	267, 268
Gasoline Blast Burner	95	" Rubber	476	" Test Measuring Microscope	295
" Burner, Dangler	97	Glue Hydrometer	273	Harvard Trip Balance	59
" Gas Generator	253	" Testing Apparatus	261	<b>Hastings</b> Aplanatic Triplets	287
Gasometers	253	<b>Göckel</b> Burette Meniscus Reader	88	<b>Hayem-Sahli</b> Haemacytometer	264
<b>Gasser</b> Grinding and Polishing Machine for Thin Sections	353	" Condenser	152	<b>Hearson</b> Bacteriological Incubators, 24, 25, 26, 29, 31, 33 and 35	
Gauge, Cover Glass	292	<b>Goetz</b> Phosphorus Tubes	116	" Coagulator for Blood Serum	34
" Glass Tubing	258	Goggles	261	" Dehydrator	44
" Paper Testing	526	<b>Goldschmidt</b> Crystal Modeling Apparatus	352	" Drying Apparatus for Serum	193
" Pressure	258, 289, 290	" Goniometers	352, 353	" " Ovens, Electric	377
" Seger Draft	290	<b>Gomberg</b> Potash Bulb	436	" Shaking Apparatus	483
" Vacuum	258	Goniometers, Goldschmidt	352, 353	" Sterilizer, Electric	40
" " McLeod's	5	" Hutchinson Universal	354	" " Steam, Electric	41
" Wire	258	" Penfield	352	" " " for Wassertest	35
<b>Gautier</b> Receiver	465	<b>Gooch</b> Crucible, Nickel	159	Heaters, Electric (Hot Plates)	268
Gauze, Wire	551	" Platinum	421	" " for Milk Testers	350
" Top Burner	97	" Porcelain	158, 159	" " for Flasks	227
<b>Gay-Lussac</b> Hydrometer	273	" Filter Tubes	218	" " with Hot Plate	270
" " Specific Gravity Bottles	491	" Tubing	480	Heating Device for Polariscopes, Landolt	428
" " Support	515	Graduated Flasks	224 to 226	Heating Device, Electric, for Polariscopes, Abderhalden	428
<b>Gayon</b> Culture Tube	172	Graduates, Glass	261	<b>Heeren</b> Pioscope	350
Gear, Speed Reducing, for Motors	363	" Enamel Ware	262	<b>Heerwagen</b> Mercury Pipette	413
<b>Gehrke and Reichenheim</b> Spectrograph	497	" for Moisture Test	261	<b>Hefner</b> Lamps for Photometers	385
<b>Geissler</b> Air Pump	217	<b>Graham</b> Dialyzer	176	<b>Heidenhain</b> Thermometer for Cryoscope	169
" Alkalimeter	7	Grain Germinator, Schönjahn	262	<b>Heim</b> Animal Cage	10
" Filter Pump	217	" Tester, Grobecker	262	<b>Heinrich</b> Hot Air Motors	363
<b>Geissler-Wetzel</b> Potash Bulb	436	Graphic Chronometers, Jaquet	400	<b>Helber</b> Counting Chamber	263
Gelatine and Glue Tester	261	Gratings, Replica	504	<b>Hellendahl</b> Staining Jar	507
Generators, Gas	253, 254	Grating Spectroscope, Zeiss	499	<b>Hempel</b> Desiccator	175
" Steam	508	Grease, for Stopcocks	511	" Distillation Flask	222
<b>Genth</b> Tripod	541	<b>Greenman</b> Burner	94	" Distilling Tube for Tar	19
Genus Covers	75	" Thermo-regulator	537	" Gas Burettes	251
Geological and Mineralogical Apparatus	352 to 361	<b>Grenet</b> Battery	66	" Palladium Tube	253
" Hammers	267	<b>Greihen</b> Weighing Bottle	553	" Pipettes	257
German Silver Crucible Tongs	539	<b>Griffin</b> Beakers	69	<b>Hempel-Friedrichs</b> Gas Pipette	256
" Weighing Dish with Counterpoise	180	Grinding, Crushing and Pulverizing Apparatus	161 to 169	<b>Hempel-Winkler</b> Gas Burette	251
" Wire	554	Grinding and Polishing Machine for Thin Sections	333	<b>Heraeus</b> Electric Hot Plates with Temperature Regulation	270
Germinator, Grain	262	<b>Grobecker</b> Grain Tester	262	" Elements for Pyrometers	451
Geryk Air Pumps	1, 2	Guard for Burners	94	" Mercury Vapor Lamp of Quartz	503
<b>Giddings</b> Low Temperature Incubators	32	Guinea Pig Holders	11	" Tube Furnaces	238
<b>Giles</b> Volumetric Flask	226	Gummed Labels	282	<b>Herman</b> Electrolytic Outfit	197
<b>Gilmore</b> Needle	113			<b>Hess</b> Viscosimeter	267
<b>Glaser</b> Combustion Furnace	236				
Glass Beads	258				
" Blower's Blast Burners	96				
" Tables	259				
" Cutter	258				
" Graduates	261				
" Rings for Micro Slides	335				
" Rod	260				
" Stirrers	260				
" Tubing	260				
" " for Sealing	258				

## H





	Page		Page		Page
<b>K</b>					
Kaehler Drying Ovens.....	375, 376	Krüger Battery.....	460	Lenses for Projection Appa- ratus.....	447
Kawin Crucible.....	159	Krüss Spectro-Colorimeter.....	145	"    Quartz.....	504
Keidel Blood Collector.....	267	Küster Anaerobic Culture Ap- paratus.....	8	"    Rocksalt.....	504
Keen Impact Ball Tester.....	267	Kymographs.....	398	"    Zeiss Anastigmatic for Dissecting, etc.....	288
Kekulé-von Baeyer Atom Mod- els.....	19	<b>L</b>			
Kennicott-Campbell-Hurley Co- lorimeter.....	144	LaBel-Henninger Distilling Tubes.....	191	Lens Holders.....	318
Kerosene Hydro Carbon Burn- er.....	97	Labels, Dennison.....	282	"    Paper.....	284
"    Micro Lamp.....	332	"    Micro Slide.....	335	"    Ring.....	289
"    Polariscope Lamp.....	433	Label Books.....	283	Lentz Anaerobic Culture Ap- paratus.....	8
Keys, Contact.....	395	Lactic Acid Funnel, Straus.....	231	Leptometer.....	370
"    Electrometer.....	395	Lactokrit, Stewart.....	116	Leuckart-Chun Zoological Charts.....	134
"    Plug.....	395	Lactometers.....	348	Levelling Bulb for Gas Bu- rettes.....	251
"    for Wheatstone Bridge.....	393	Lactoscope, Feser.....	349	Level Support.....	284
Kinotherm (Shaking Appara- tus).....	484	Ladenburg Distillation Flask.....	222	Liebig Condensers.....	152
Kipp Generator.....	253	Lambrecht Hygrometer.....	275	"    Drying Tubes.....	193
Kirchbraun Cementation and Ductility Machine.....	15	"    Polymeter.....	275	"    Potash Bulb.....	436
Kirchbraun-Sargent Adhesion Machine.....	15	LaMotte Calcium Chloride Drying Tube.....	99	Liebig-Kyll ".....	436
Kirchoff-Bunsen Spectroscopes.....	494	Lamps, Alcohol.....	283	Liebmann-Meier Water Bath.....	36
Kirkbride Slide Forceps.....	228	"    Harcourt Pentane.....	256	Light Filters, Wratten & Wain- wright, for Micro-Photogra- phy.....	342
Kitasato Animal Holder.....	11	"    Hefner, for Photom- eters.....	385	Lightning Jars.....	281
"    Filter Apparatus.....	209	"    Mercury Vapor.....	502	Lillie Compartment Paraffine Embedding Oven.....	42
Kjeldahl Apparatus for the Determination of Ni- trogen.....	364 to 366	"    Microscope.....	331	Lime-Sulphur Hydrometer.....	273
"    Connecting Bulbs.....	366	"    Photometer Standard.....	385	Lincain Burette Clamp.....	141
"    Flasks.....	223	"    Polariscope.....	433	Linen Tape Measure.....	291
Klaeger Insect Pins.....	412	"    for Projection Appa- ratus.....	447	"    Testers.....	288
Knife, Brain.....	181	Lamp Wicking.....	283	Lintner Pressure Bottle.....	84
"    Cartilage.....	181	Lancets for Blood.....	267	Lippich Polariscope.....	426
"    Cork.....	282	Landolt Heating Device for Polariscope.....	428	Liquid Air Apparatus.....	284
"    Microtome.....	347	"    Polariscope.....	427, 429	Liquor Culture Flask.....	171
"    Sectioning.....	347	"    Polariscope Lamp.....	434	Listmus Pencils.....	382
"    Virchow.....	181	"    Tubes.....	435	Lohnstein Saccharometers.....	544
Knife Holders for Microtome Knives.....	347	Landouzy and Labbe Charts of Haematology and Cytology.....	131	Lomshakow Gas Analysis Ap- paratus.....	246
Knorr Extrusion Apparatus.....	206	Lantern Slide Enlarging Out- fit.....	439	Lothar-Meyer Drying Ovens.....	375
"    Flask.....	205	Lautenschlaeger Filter Paper.....	216	"    Hot Air Funnel.....	230
Kny Botanical Charts.....	126	"    Hot Air Ster- ilizer.....	39	Lovibond Tintometer and Ac- cessories.....	148
Koch Bacteria Grinding Ap- paratus.....	167	LaWall Separatory Funnel.....	231	Low Flask for Copper Deter- minations.....	218
"    Culture Flasks.....	171	Leach Separatory Funnel Sup- port.....	233	Low Temperature Burners.....	97
"    Safety Burners.....	98	Lead Dishes.....	180	"    Incubators.....	31
Kohl Specific Gravity Bottle.....	491	"    Pipe.....	412	"    Incubator.....	32
Kohlrausch Conductivity Cells.....	390	"    Shot.....	283	"    Giddings.....	32
"    Model for Lecture Table Demonstra- tion of the Migra- tion of Ions.....	397	Leather and Cloth Tester, Schopper.....	525	"    Thermome- ters.....	533
"    Slide Wire Bridge.....	394	LeChatelier Pyrometer.....	451	"    Thermostat.....	285
"    Sugar Flasks.....	226	"    Soundness Test Apparatus for Cem- ent.....	112	Lucksch Bacteriological Charts.....	125
Kohlrausch-Holborn Conduc- tivity Cell.....	390	"    Specific Gravity Bottles.....	114, 492	Ludwig Electrodes.....	402
"    "    Platiniz- ing Solu- tion.....	394	Lecture Apparatus, Hoffman.....	283	Ludwig-Cyon Mercury Man- ometer.....	400
Kohlrausch-Ostwald Apparatus for the Determination of the Conductivity of Electrolytes.....	390	"    Table Balances.....	54	Luer Syringes.....	519
Kolkwitz Plankton Magnifier.....	288	Leeds Diamond Mortar.....	362	Luminescence Microscope and Accessories, Zeiss.....	328
Kolle Culture Flasks.....	171	Leeds & Northrup Resistance Box.....	394	Lummer-Brodhun Photometer Sight-Box.....	384
"    Inoculating Needles.....	364	"    Slide Wire Bridge.....	394	Lummer-Straubel Mercury Va- por Lamps.....	502
König Centrifuge.....	123	Lehmann Cardiograph.....	407	Lunge Distillation Flask.....	222
"    Differential Manometer.....	290	"    Extraction Tube.....	205	"    Nitrometers.....	367
"    Spectrophotometer with Wanner Pyrometer.....	457	"    Pneumograph.....	407	"    Weighing Bottle.....	553
Körner Drug Mill.....	165	"    Sphygmograph.....	407	Luther Capillary Electrometer Tube.....	395
Kossel Sodium Press.....	438	Lendenfeld Charts of Human Anatomy.....	124	"    Platinum Electrodes.....	396
		Lenses, Pocket.....	286	"    Stirring Device.....	393
				Lux Gas Balance.....	250
				Lymph Grinding Apparatus.....	168



M		Page			Page			Page
Maassen Filter Cylinder.....	210		Mechanical Stages, B. & L.....	316		Micrometer Ocular, Net, for		
Macfaedyn Bacteria Grinding			"    Zeiss.....	320		Blood Counting.....	264	
Apparatus.....	167		"    Stirrer for Molec-			Micro-Photographic Apparatus		
Mach Decimal Balance.....	54		"    ular Weight De-			337 to 342		
"    Immersion Oil Bottle....	77		"    termination Appa-			"    "    Apparatus for Met-		
Mackenzie Ink Polygraph.....	405		"    ratus.....	380		"    "    allography 298		
Macro and Micro Polariscope....	427		Medicine Droppers.....	412		"    "    Drawing		
Magnalium Balances.....	57		Medium Laboratory Micro-			"    "    and Projection		
Magnetic Field Electrolysis			tome.....	343		"    "    Apparatus		
Apparatus.....	200		Melting Point Tube.....	297		"    "    Com-		
Magnets.....	386		Mendeleeff Charts of the Ele-			"    "    bined.....	339	
Magnification Table.....	322		ments.....	130		Micro Polariscopes, Fischer.....	429	
Magnifiers, Bausch & Lomb.....	286		"    Periodic System of			Microscopes and Accessories		
"    Zeiss Anastigmatic.....	288		"    the Elements.....	555		Bausch and Lomb		
"    for Balances.....	64		Meniscus Reader for Burettes....	88		"    and Accessories.		
Magnifier Stands, Adjustable....	313		Mercury Commutator.....	395		"    Zeiss.....	318 to 330	
Mahler Bomb Calorimeter.....	102		"    Manometers.....	400		Microscope, for		
Mailing Cases for Micro Slides...	335		"    Pipettes.....	413		Nernst Balance.....	53	
Mall Seeker, or Probe.....	184		"    Still, Hulett.....	297		"    Binocular, B. & L.	312	
Maltwood Finder.....	324		"    Troughs.....	297		"    Chun.....	330	
Manganese Tubes for Color			"    Vapor Lamps.....	502, 503		"    "    Zeiss.....	325	
Comparison, Camp.....	143		"    "    Arc Lamp, for			"    "    Crystallographic,		
Manometers.....	280		"    Microscopes.....	332		"    "    Zeiss.....	330	
Manometers for Physical Chem-			"    Wells for Armored			"    "    Demonstration,		
istry.....	400		"    Thermometers.....	534		"    "    B. & L.	311	
Mantels for Berkefeld Filters....	210		Mesuré and Nouel Optical Py-			"    "    Dissecting, B. & L.	313	
"    Welsbach Lamps.....	331		rometer.....	455		"    "    Meyer	327	
Marchand Calcium Chloride			Metallic Tubing, Flexible.....	542		"    "    Luminescence,		
Tubes.....	100		Metallographic Apparatus 298 to	303		"    "    Zeiss.....	328	
Marey Tambours.....	401		"    Microscope and			"    "    Measuring.....	291	
Marey-Straub Tambour.....	401		"    Camera, Tassin	300		"    "    Metallographic 298 300		
Markers, Signal.....	401		Metallurgical Microscopes 298,			"    "    Micrometer.....	291	
Marquardt Combustion Tubes....	149		300, 301, 302.....	303		"    "    Petrographical.....	355	
Pyrometer ".....	450		Meters, Gas.....	255		"    "    Portable, B. & L.	311	
Marking Apparatus for Micro			"    "    Bohr.....	404		"    "    "    Zeiss.....	323	
Objects.....	333		"    "    for Junkers Ca-			"    "    Projection.....	446	
Marshall Apparatus for the			"    "    lorimeter.....	108		"    "    Reading.....	296	
Determination of Urea in			Meter Sticks.....	290		"    "    Ultra, Zeiss.....	329	
Blood.....	266		Metric Tables.....	556		Microscope Lamps.....	331	
Martens Densitometer.....	387		Metronome, Jaquet.....	400		"    Oven.....	333	
"    Direct Vision Spec-			Metzner Respiration Valve.....	403		Microspectral Objective, En-		
"    troscope.....	493		Meyer Anaesthetizing Cham-			"    gelmann.....	324	
"    Illuminometer.....	385		"    bers.....	403		"    Microspectroscope, Abbe.....	324	
"    Polarisations Photo-			"    Artificial Respiration			"    Micro-Tessar Objective.....	342	
"    meter.....	386		"    Apparatus.....	403		"    Microtomes and Accessories.	343	
"    Relative Photometer....	385		"    Cylinder for Hydraulic			"    Miescher Mixing Pipette.....	263	
Martin Culture Flask.....	172		"    Presses.....	437		"    Migration of Ions, Kohlrausch		
"    Double Jet Water Cen-			"    Dissecting Microscope.....	327		"    Apparatus for.....	397	
"    trifuge.....	117		"    Sulphur Apparatus.....	512		"    Migration Tube.....	396	
"    Filter Apparatus.....	209		Mica Covers for Brain Sections	334		"    Milk Fat Refractometer.....	466	
Mason Hygrometer.....	274		Mice Holders.....	11		"    "    Pipette for Counting Bacter-		
Mats, Asbestos.....	14		Micro Balance.....	53		"    "    teria.....	413	
Mathews Water Bath.....	551		"    Burner.....	91		"    "    Testing Apparatus.....	348 to 351	
Mattresses for Blowpiping.....	286		"    Cover Glasses.....	334		"    "    Milling Machine, Johnson.....	164	
Maximum and Minimum Ther-			"    Drawing Apparatus.....	317		"    "    Milliammeters and Ammeters... 200		
mometers.....	535		"    Labels for Slides.....	335		"    "    Millivoltmeters and Voltmeters	200	
McCoy Boiling Point Appara-			"    Lamps.....	331		"    "    Mills.....	161 to 169	
"    tus.....	389		"    Object Marking Appa-			"    "    Minerals, Radio-Active.....	460	
"    Gas Generator.....	253		"    ratus.....	333		"    "    Mineral Oil Distillation Appa-		
McLeod Anaerobic Culture Ap-			"    Slides.....	334		"    "    paratus, Engler.....	373	
"    paratus.....	8		"    Slide Boxes.....	335		"    "    Sectioning Apparatus.....	352	
"    Vacuum Gauge.....	5		"    Cabinets.....	336		"    "    Mineralogical, Crystallographic		
McMyn Weighing Bottle.....	553		"    "    Mailing Cases.....	335		"    "    and Petrographical Appa-		
McNeill High Vacuum Rotary			"    "    Trays.....	336		"    "    tus.....	352	
Pump.....	6		"    "    Tubes for Polariscopes,			"    "    Mineralogical Collections.....	361	
Measuring Appliances.....	290		"    Fischer.....	434		"    "    Hammers.....	267	
"    Microscopes.....	291		"    Warm Stages.....	333		Minot Metal Micro Slide Cab-		
Measures.....	290		Micrometer, for Cement.....	111		"    net.....	336	
Measure for Acid in Milk Test			"    Stage, B. & L.....	316		"    Automatic Precision Mi-		
350.....			"    Zeiss.....	324		"    crotome.....	344	
"    Tape.....	291		Micrometer Calipers.....	290		"    Rotary Microtome.....	344	
Measuring Cones.....	291		"    Microscopes.....	291 to 295		Minute Glasses.....	481	
"    Tubes for Gas.....	253		"    Oculars, B. & L.....	316		Miquel Culture Flasks.....	171	
Meat Chopper.....	297		"    "    Zeiss.....	324				

	Page		Page		Page
<b>Mitscherlich</b> Desiccator.....	175	<b>N</b>		<b>Oculars, Zeiss</b> .....	320
“ <b>Eudiometer</b> .....	205	<b>Naples Jar</b> .....	507	“ <b>Paired, Zeiss</b> .....	326
“ <b>Polariscopes</b> .....	424, 426	“ <b>Object Clamp for Microtomes</b> .....	346	<b>Ocular, Abbe Stereoscopic</b> .....	324
<b>Mixing Bottle</b> .....	173	<b>Needles, Dissecting</b> .....	182	“ <b>Adjustable, Zeiss</b> .....	264
“ <b>Cylinders, Precision</b> .....	174	“ <b>Gilmore</b> .....	113	“ <b>Ehrlich</b> .....	265
“ <b>Jar</b> .....	84	“ <b>Innoculating</b> .....	364	“ <b>Double Demonstrating</b> .....	333
“ <b>Pipettes for Haemacytometers</b> .....	263	“ <b>Syringe</b> .....	518	“ <b>Spectral, Abbe</b> .....	324
<b>Models, Anatomical, Botanical, etc.</b> .....	9	<b>Needle Apparatus, Vicat</b> .....	113	<b>Ocular Diaphragm for Blood Counting</b> .....	264
“ <b>Atom</b> .....	19	“ <b>Holders</b> .....	182	“ <b>Micrometers, Zeiss</b> .....	324
“ <b>Configuration</b> .....	19	<b>Neisser Culture Dishes</b> .....	170	“ <b>Micrometer Discs, B. &amp; L.</b> .....	316
“ <b>Crystal</b> .....	359	“ <b>Test Tube Cleaner</b> .....	522	“ <b>Net Micrometer, for Blood Counting</b> .....	264
“ <b>of Crystal Axes</b> .....	358	<b>Nernst Conductivity Cell</b> .....	391	<b>Ohm's Law Demonstration Apparatus</b> .....	195
“ <b>Nicol Prism, Vrba</b> .....	357	“ <b>Illuminating Device for Spectroscope with Polariscopes</b> .....	429	<b>Oil Sample Bottles</b> .....	84
“ <b>Polarisation, Vrba</b> .....	358	“ <b>Micro Balance</b> .....	53	“ <b>Stone</b> .....	182
“ <b>of Rhombohedron</b> .....	358	“ <b>Lamps</b> .....	331	“ <b>Testing Apparatus</b> .....	368 to 373
<b>Modeling Apparatus for Crystals, Goldschmidt</b> .....	352	<b>Nessler Color Comparison Tubes</b> .....	143	“ <b>Machine, Thurston</b> .....	271
<b>Mohr Condenser</b> .....	153	“ <b>Tube Support</b> .....	144	<b>Ointment Pots</b> .....	383
“ <b>Pinchcocks</b> .....	142	<b>Nestler Slide Rule</b> .....	449	<b>Olsen's Testing Machine for Cement</b> .....	112
“ <b>Pipettes</b> .....	413, 414	<b>Nets for Foot Blowers</b> .....	73	<b>Olzowski Liquid Air Apparatus</b> .....	254
“ <b>Potash Bulbs</b> .....	436	<b>Net Electrodes, Nickel, Fischer</b> .....	199	“ <b>Thermostat for Low Pressures</b> .....	285
<b>Moissan Electric Arc Furnace</b> .....	241	“ <b>Micrometer for Oculars for Blood Counting</b> .....	264	<b>Opsonic Incubators</b> .....	36
<b>Moist Chambers</b> .....	170	<b>Neubauer-Bürker Haemacytometer</b> .....	263	<b>Optical Pyrometer, Mesuré &amp; Nouel</b> .....	455
“ <b>Böttcher</b> .....	156	<b>Nichrome Wire</b> .....	554	“ <b>Wanner</b> .....	456
<b>Moisture Balances</b> .....	59, 61	<b>Nickel Chromium Triangles</b> .....	540	<b>Ore Grinders</b> .....	163
“ <b>Test Cylinder</b> .....	173	“ <b>Crucibles</b> .....	159	<b>Organic Analysis Furnace Heraeus-Dennstedt</b> .....	239
“ <b>Flasks</b> .....	222	“ <b>Crucible Tongs</b> .....	539	“ <b>Tissue Grinding Apparatus</b> .....	167 to 169
“ <b>Graduate</b> .....	261	“ <b>Dishes</b> .....	180	<b>Orlovius Flask</b> .....	220
<b>Molecular Air Pump, Gaede</b> .....	4	“ <b>Net Electrodes, Fischer</b> .....	199	<b>Orsat-Allyn and Moyer Gas Analysis Apparatus</b> .....	245
“ <b>Weight Determination Apparatus, Beckmann</b> .....	388, 389	“ <b>Spatulas</b> .....	490	<b>Orsat-Dennis Gas Analysis Apparatus</b> .....	245
“ <b>Weight Determination Apparatus for Essential Oils, Schimmel</b> .....	373	“ <b>Spoons</b> .....	506	<b>Orsat-Fischer Gas Analysis Apparatus</b> .....	245
“ <b>Weight Determination Apparatus for Physiological and Clinical Work</b> .....	169	“ <b>Triangles</b> .....	540	<b>Orsat-Lunge Gas Analysis Apparatus</b> .....	245
<b>Monochromatic Illuminators</b> .....	500, 501	“ <b>Wire</b> .....	554	<b>Orsat-Muencke Gas Analysis Apparatus</b> .....	245
“ <b>Zeiss</b> .....	332	<b>Nicol Prism, Model of, Vrba</b> .....	357	<b>Osmoscope</b> .....	417
<b>Moore Staining Dish</b> .....	507	“ <b>Specific Gravity Bottle</b> .....	491	<b>Osram Photometer Lamps</b> .....	385
<b>Morochowetz Filter Paper</b> .....	216	<b>Ninhydrin</b> .....	177	<b>Ostwald Binding Posts</b> .....	394
“ <b>Funnel</b> .....	220	<b>Nissenson Switch Board for Electrolysis</b> .....	198	“ <b>Capillary Electrometer Tube</b> .....	395
<b>Morse Calibrating Burettes</b> .....	88	<b>Nitrogen Bulbs</b> .....	366	“ <b>Clamp</b> .....	140
“ <b>Rendimento (Hydrometer)</b> .....	273	“ <b>Determination Apparatus</b> .....	364 to 367	“ <b>Conductivity Cells</b> .....	390
<b>Mortars</b> .....	362	<b>Nitrogen, Urea and Ammonia in Urine, Folin Apparatus for</b> .....	543	“ <b>Constant Temperature Baths</b> .....	392
<b>Motors, Electric</b> .....	363	<b>Nitrometers</b> .....	367	“ <b>Electrode Cells</b> .....	396
“ <b>Hot Air</b> .....	363	<b>Normal Elements, Cadmium</b> .....	396	“ <b>Electro-motive Force Determination Apparatus</b> .....	395
“ <b>Water</b> .....	362	“ <b>Thermometers</b> .....	531	“ <b>Funnel Support</b> .....	232
<b>Moulds, Briquette, Asphalt</b> .....	15	<b>Norris Potash Bulb</b> .....	436	“ <b>Pipette</b> .....	413
“ <b>Cement</b> .....	111	<b>Northrup High Temperature Electric Furnaces</b> .....	243	“ <b>for Folin Apparatus</b> .....	543
“ <b>Cubical, for Asphalt</b> .....	15	<b>Nosepieces, Bausch &amp; Lomb</b> .....	315	“ <b>Thermostats</b> .....	392
“ <b>Cupel</b> .....	172	“ <b>Zeiss</b> .....	324	“ <b>Toluol Regulators</b> .....	393
“ <b>Pitch</b> .....	18	<b>Novy Anaerobic Culture Apparatus</b> .....	8	“ <b>Viscosity Determination Outfit</b> .....	397
“ <b>Pouring</b> .....	364	“ <b>Cover Glass Forceps</b> .....	227	<b>Ostwald-Kohlrausch Apparatus for the Determination of the Conductivity of Electrolytes</b> .....	390
<b>Mounting Paper, Botanical</b> .....	75	<b>Nutting Hand Spectrophotometer</b> .....	501	<b>Oven for Asphalt Testing</b> .....	15
<b>Mouse Jars</b> .....	11	“ <b>Polarisation Photometer Attachment</b> .....	496	“ <b>Conditioning, Emerson</b> .....	529
<b>Mouth Pieces for Blowpipes</b> .....	74	“ <b>Precision Calorimeter</b> .....	146	“ <b>Schopper</b> .....	528
<b>Muencke Filter Pump</b> .....	217	<b>O</b>		“ <b>Drying</b> .....	374 to 381
“ <b>Gas Washing Bottle</b> .....	251	<b>Object Clamps for Microtomes</b> .....	346		
<b>Muffles, Alundum</b> .....	364	“ <b>Holder, Wolf</b> .....	289		
“ <b>Battersea</b> .....	364	“ <b>Marking Apparatus</b> .....	333		
“ <b>Silica</b> .....	364	“ <b>Slides, Micro</b> .....	334		
<b>Muffle Furnaces, Fletcher</b> .....	235	<b>Objectives, Paired, Zeiss</b> .....	326		
“ <b>Hoskins</b> .....	240	“ <b>Zeiss</b> .....	321		
“ <b>Weisnegg</b> .....	235	<b>Objective Changer, Zeiss</b> .....	324		
<b>Multiple Tube Burners</b> .....	91				
<b>Munkell Filter Paper</b> .....	213				
<b>Museum Jars</b> .....	276 to 281				

	Page		Page		Page
Oven for Melting Point of Hard Pitch.....	18	Pencils, Wax.....	382	Pill Tiles.....	412
" for Microscopes.....	333	Penetrometers.....	15	Pillsbury Boxes.....	335
" Paraffine Embedding.....	42, 43	" Schutte.....	18	Pins, Insect.....	412
" Vacuum.....	379 to 381	<b>Penfield Application Goniometer</b> .....	352	Pinchcocks, Mohr.....	142
Oxygen Capacity of Blood Apparatus, Barcroft and Haldane.....	405	<b>Pennock and Martin Crucible</b> .....	159	Pinning Forceps.....	227
Oxygen Cylinders.....	252	<b>Pensky-Martens Flash Point Testers</b> .....	369	<b>Plorkowski Culture Flask</b> .....	171
<b>P</b>		Pentane Lamp, Harcourt.....	256	Pioscope, Heeren.....	350
Paul, for Waste.....	546	" Thermometers for Low Temperatures.....	533	Pipe, Block Tin.....	412
Paired Objectives, Zeiss.....	326	Peptone, Silk.....	177	" Lead.....	412
" Oculars.....	326	Percentage Scale for Cement.....	113	Pipe Wrench.....	423
Paleontological Charts.....	132	Percolators.....	382	Pipe-Stem Triangles.....	539
Palladium Tube for Gas Analysis.....	253	Percolator Bottle.....	382	Pipettes.....	412
Palm Oil Soap.....	348	Perforated Porcelain Plates for Funnels.....	419	" Automatic.....	412
<b>Pamquist Gas Analysis Apparatus</b> .....	249	Permeability Testing Apparatus.....	111	" Blood, Wright.....	267
Pans for Balances.....	64	<b>Permin Safety Pipette</b> .....	414	" Certified.....	414
" Calorimetry, Platinum.....	422	<b>Perot-Fabry Mercury Vapor Lamp</b> .....	503	" Dropping.....	412
" Cement.....	114	Per Se Sieve Shakers.....	188	" Gas.....	256
" Dissecting.....	538	<b>Peters Electrolytic Support</b> .....	199	" Haemacytometer.....	263
" Incinerating, Platinum.....	421	<b>Petersen-Palmquist-Anderson Gas Analysis Apparatus</b> .....	249	" Mercury.....	443
Paper, Asbestos.....	14	<b>Petri Dishes</b> .....	170	" Milk, Babcock.....	350
" Dialyzing.....	382	Petrographical, Crystallographic and Mineralogical Apparatus.....	352 to 361	" Ostwald, for Folin Apparatus.....	543
" Drying, Botanical.....	75	Petrographical Charts.....	361	" Serological.....	413
" Emery.....	205	" Microscopes.....	355 to 357	" Transfer.....	413
" Fat Extracted, for Milk Analysis.....	350	Petroleum Collections.....	361	" Viscosity, for Glue.....	370
" Filter.....	213 to 216	<b>Pfeiffer Micro Warm Stage</b> .....	333	" Volumetric.....	413
" Glazed.....	382	<b>Pfurtscheller Zoological Charts</b> .....	134	Pipette Boxes.....	415
" for Kymographs.....	398	<b>Phillips Beakers</b> .....	71	" Rest.....	415
" Lens.....	284	Phipps Institute Animal Cage.....	11	" Supports.....	412
" Mounting, Botanical.....	75	Phosphoric Acid Flask, Volumetric.....	324	Piston Recorder, Hürthle.....	400
" Parchment.....	382	Phosphorus Tubes, Goetz.....	116	Pitch Mould.....	18
" Pressing, Botanical.....	75	Photographic Camera for Spectroscopy.....	494	Pitchers, Acid.....	1
Paper Filtering Cones.....	215	" Plates, Wratten and Wainwright for Spectroscopy.....	506	Placentapeptone.....	177
" Testers, Schopper.....	525	" Register, Dodge.....	109	Plankton Magnifier.....	288
" Thickness Gauge.....	526	Photometers and Accessories.....	382 to 387	Plant Pathology Charts.....	129
Paraboloid Condensers, B. & L. Substage Condensers, Zeiss.....	320	Photometer Sector.....	498	" Physiology Apparatus.....	416 to 418
Paraffine Embedding Bath.....	43	" Spectro.....	496	" Ganong.....	128
" Box.....	348	" Sulphur Parr.....	512	" Physiology Charts.....	128
" Ovens.....	42, 43	Photometer Sight-Box.....	384	" Press.....	75
" Table.....	348	" Standard Incandescent Lamps.....	385	Plasticine for Anaerobic Culture Apparatus.....	8
Parasite Incubator, Hearson.....	30	Photo-Micrographic Apparatus.....	337 to 342	Plates for Air Pumps.....	6
Parasitic Protozoa and their Carriers, Charts of.....	131	Photo-Micrographic Apparatus for Metallography.....	298	" Color Reaction.....	419
Parchment Paper.....	382	Photo-Micrographic, Drawing and Projection Apparatus.....	339	" for Desiccators.....	175
<b>Parr Carbon Apparatus</b> .....	110	Combined.....	339	" Glass, for Cement.....	419
" Gas Calorimeter.....	107	Photophysynthometer.....	417	" Hot, Electric.....	268
" Oxygen Bomb Calorimeter.....	102	Physical Chemistry Apparatus (Not including Apparatus for Quantitative Electrolysis).....	385 to 397	" Gas.....	268
" Standard Calorimeter.....	101	Physiological and Clinical Apparatus.....	398 to 411	" with Flask Heater.....	270
" Sulphur Photometer.....	512	Picard-Law Modification of Hopkins Condenser.....	132	" Petri, Culture.....	170
<b>Paschen Galvanoscope</b> .....	201	Pick Glasses.....	288	" Perforated, Porcelain, for Funnels.....	419
Paste Board Boxes.....	85	Pill Boxes.....	85	" Photographic, Wratten & Wainwright, for Spectroscopy.....	506
<b>Pasteur Culture Flask</b> .....	172	" Knives.....	490	" Porous.....	419
<b>Pasteur-Chamberland Filter</b> .....	210			" Silica.....	419
" Cylinders.....	210			" Streak.....	419
" Pressure Filter.....	211			Plate Holders for Micro-Photographic Apparatus.....	338
Pastille Press.....	389			Platinin Wire for Inoculating Needles.....	364
Payne Platinum Dish.....	421			Platinizing Solution.....	394
Pebble Mills.....	166			Platinum Ware.....	420 to 424
<b>Pelilot Calcium Chloride</b> .....	100			" Blowpipe Tips.....	396
Tubes.....	435			" Electrodes.....	364
<b>Pellet Polaroscope Tube</b> .....	382			" Resistance Calorimeter Thermometer.....	105
Pencils, Litmus.....	382			" Resistance Thermometers.....	453
				" Rhodium Couple for Brown Pyrometers.....	450
				" Wound Tube Furnaces, Heraeus.....	238

	Page		Page		Page
<b>Plattner</b> Crucible.....	159	Porous Cups or Cells.....	172	<b>Pumps, Acid</b> .....	1
"    Diamond Mortar.....	362	"    Plates.....	419	"    Air.....	1 to 6
<b>Plehn-Nuttal</b> Microscope Oven.....	333	Portable Microscope, B. & L.....	311	"    Artificial Respiration.....	402
<b>Pleier</b> "Raumwinkelmesser".....	386	"    Zeiss.....	323	"    Compression for Gases.....	151
<b>Plesch</b> Chromophotometer.....	147	"    Polygraphs.....	407	"    Filter.....	217
<b>Pliers</b> .....	423	"    Projection Apparatus.....	441	"    Pressure.....	1 to 6
<b>Plucker</b> Spectrum Tubes.....	505	Posts, Binding, Ostwald.....	394	"    Suction.....	1 to 6
<b>Plug Key</b> .....	395	Potash Bulbs.....	436	"    "    and pressure.....	218
<b>Plumbago</b> Crucibles.....	157	Potash Bulb Support.....	436	"    Vacuum.....	1 to 6
<b>Pneumatic</b> Troughs.....	423	Potentiometer, Fischer, for.....	199	<b>Purinometer</b> Hall.....	543
<b>Pocket</b> Magnifiers.....	286	Cathode Potentials.....	199	<b>Pycnometers</b> .....	491
"    Spectroscope.....	492	Potentiometer Indicator, Leeds.....	451	<b>Pyrometers</b> .....	49 to 458
"    Thermometers.....	535	& Northrup.....	451	<b>Pyrometer</b> Cones, Seger.....	458
<b>Pohl</b> Commutator.....	402	Potentiometer Method for.....	395	"    Tubes, Alundum.....	458
<b>Polarisation-Colorimeter</b> .....	145	Electro-Motive Force Ap- paratus.....	417		
<b>Polarisations</b> Photometer, Mar- tens.....	386	Potometer.....	417		
<b>Polarisations</b> Photometer, Nut- ting.....	496	Pouring Moulds.....	364		
<b>Polariscopes</b> and Accessories.....	424 to 435	<b>Prat-Dumas</b> Filter Paper.....	216		
<b>Polariscopes</b> for General Pur- poses.....	426 to 428	Precipitating Jars.....	282		
"    "    Sugar Analy- sis.....	430, 431	Precision Burettes.....	89		
"    "    Urine Analy- sis.....	424	"    Flasks, Volumetric.....	225		
<b>Polariscope</b> Cases.....	432	"    Hydrometers.....	271, 273		
"    Cover Glasses.....	435	"    Microtome, Minot.....	344		
"    Illuminating De- vice, Electric.....	432	"    Mixing Cylinders.....	174		
"    Lamps.....	433	"    Pipettes.....	414		
"    Test Plates.....	435	"    Thermometers.....	531		
"    Tubes.....	434	"    Urinometers.....	545		
<b>Polarizers</b> for Microscopes, B. & L.....	317	Preparation Dishes.....	180		
<b>Policemen</b> , Rubber.....	476	"    Jars.....	276 to 281		
<b>Polishing</b> and Grinding Ma- chine for thin Sections.....	353	Prescription Balances.....	56, 57, 59		
<b>Polygraphs</b> for the Study of the Circulation.....	405 to 411	Press, for Corks.....	155		
<b>Polymer</b> , Lambrecht.....	275	"    Filter.....	217		
<b>Poppe</b> Shaking Apparatus.....	484	"    Hydraulic.....	437		
<b>Porcelain</b> Burner.....	92	"    Laboratory.....	438		
"    Casseroles.....	110	"    Pastille.....	389		
"    Combustion Boats.....	149	"    Plant.....	75		
"    "    Capsules.....	149	"    Sodium.....	438		
"    "    Tubes.....	149	"    Tincture.....	438		
"    Crucibles.....	158	Pressing Paper, Botanical.....	75		
"    Culture Dishes.....	170	Pressure Blowers.....	73		
"    Evaporating Dishes.....	178	"    Bottles.....	84		
"    Funnels.....	229	"    Filter Apparatus.....	211		
"    Mercury Troughs.....	297	"    Gauges.....	258, 289		
"    Mills.....	164, 166	"    Pumps.....	1 to 6		
"    Mortars.....	362	"    Regulator, Gas, for Junker Calorimeters.....	108		
"    Pipette Support.....	415	"    Regulator, for Gas Cylinders.....	252		
"    Plates for Color Re- actions.....	419	"    Gas, for Thermo- regulators.....	537		
"    "    Desicca- tors.....	175	"    Tubing, Rubber.....	479		
"    "    Funnels.....	419	Prest-o-lite Gas Tank.....	441		
"    Retorts.....	474	Primary Batteries.....	65, 66		
"    Rings.....	475	Prince Rupert Drops.....	480		
"    Shelf for Pneumatic Troughs.....	423	Prism, Nicol, Model of.....	357		
"    Spatulas.....	490	Prisms, Spectro.....	504		
"    Spoons.....	506	Probes.....	184		
"    Swimming Cups.....	515	Projection Apparatus and Ac- cessories.....	439 to 448		
"    Trays.....	538	Projection, Drawing and Mi- cro-Photographic Apparatus Combined.....	339		
"    Tray for Sputum Analysis.....	506	Projection Microscopes.....	446		
"    Tubes for Heraeus Elements.....	451	Protozoa, Parasitic, with their Carriers, Charts of.....	131		
"    Watch Glasses.....	547	Psychrometer, Sling.....	274		
"    Water Bath.....	548	<b>Pukal</b> Filter Balloon.....	210		
		<b>Pulfrich</b> Refractometer.....	468		
		Pulleys on Support for Trans- mission.....	515		
		Pulverizing, Crushing and Grinding Apparatus.....	161 to 169		

## Q

<b>Quartz</b> Apparatus, Transparent.....	459
"    Lenses.....	504
"    Mercury Vapor Lamp.....	503
"    Pyrometer Tubes.....	450
"    Substage Condensers.....	320
"    Test Plates for Polari- scopes.....	435
"    Thermometers.....	532
<b>Quevenne</b> Lactometers.....	348

## R

<b>Rabe</b> Water Motors.....	362
<b>Racks</b> Filter.....	216
"    for Staining Slides.....	507
"    "    Syringes.....	516
"    "    Test Tubes.....	523
"    Radial Burner, Fletcher.....	97
"    Radiation Pyrometers, Thwing.....	457
"    Radio-active minerals.....	460
"    Radio-Chemistry Apparatus.....	460 to 464
<b>Rake</b> , Cupel.....	172
<b>Rammelsberg</b> Drying Oven.....	374
<b>Ramsay-Young</b> Gas Compress- ion Pump.....	151
<b>Ranke</b> Reaction Glass.....	543
"    "    Raumwinkelmesser.....	386
<b>Ravanel</b> Culture Dish Holder.....	171
"    Innoculating Needles.....	364
<b>Ray</b> Filters for Spectroscopy.....	503
<b>Razors</b> , Section.....	347
<b>Razor</b> Strops.....	348
<b>Reaction</b> Glass, Ranke.....	543
"    Plates.....	419
<b>Reader</b> for Burette Meniscus.....	88
<b>Reading</b> Device for Thermom- eters.....	533
<b>Reading</b> Glasses.....	288
"    Glass for Balances.....	64
"    Microscopes.....	296
"    Microscope for Nernst Balance.....	53
"    Telescopes.....	296
<b>Reagent</b> Bottles.....	80 to 83
<b>Reagents</b> for Abderhalden's Dialyzing Method.....	177
<b>Receivers</b> for Distillations in Vacuum.....	465
"    for Pressure Blowers.....	73
"    "    Retorts.....	465
<b>Receiver</b> and Cover for Sieves.....	486
<b>Reckoner</b> , Ackermann Auto- matic.....	351
<b>Record</b> Syringes.....	517
<b>Record-Bruneau</b> Syringes.....	518
<b>Recorder</b> , Piston.....	400
<b>Recorders</b> , Temperature, Leeds & Northrup Patent.....	454



	Page		Page		Page
Recorder and Regulator for Electric Pyrometers, Thwing.	237	Richard Recording Barometer..	65	Rubber Tubing .....	478
Recording Barometer .....	65	" Thermograph .....	534	" Stretcher .....	480
" Drum, Sherrington-Starling .....	390	Richards Filter Pump .....	217	" Viscosimeter .....	480
" Thermometers .....	534	Riche Adiabatic Calorimeter and Accessories .....	104	Ruehmann Uricometer .....	544
Red Fibre Blocks .....	348	Richmond Slide Rule .....	350	Ruhmkorf Induction Coils .....	275
Reduction Tubes .....	465	Rickards Spout Shakers .....	482	Ruhrstrat Rheostats .....	203
Reductor, Jones .....	465	Riders, for Balances .....	64	Rules .....	290
Redwood Viscosimeter .....	370	Rieder Mixing Pipette .....	263	Rule, Richmond, Slide .....	350
Reed Extraction Apparatus .....	207	Riesenfeld Spectrum Burner .....	502	" Slide .....	489
Reflecting Stereoscope, Zeiss .....	326	" Lamp .....	502	Rupert Drops .....	480
Reform Syringes .....	518	Riesenfeld and Wohlers Spectrum Burner .....	502	Rutherford Electroscopes .....	464
Refractometers and Accessories .....	465 to 473	Rings, Concentric .....	475	" Prism .....	494
Refractory Cement, Alundum .....	7	" for Micro Slides .....	335		
" Vulcan .....	7	" Straw .....	512	S	
Refrigerators .....	45	" Suberite .....	512	Saccharimeters .....	430
Register, Photographic, Dodge .....	409	" for Supports .....	512	Saccharo-manometer .....	544
Regnault Specific Gravity Bottles .....	491	Ring Burner .....	94	Saccharometers .....	544
Regulator, Gas .....	256	" Supports .....	514	Safety Burners, Koch .....	98
" Pressure, for Gas .....	256	Ringer Extraction Apparatus .....	206	" Tubes .....	232
" Cylinders .....	252	Roasting Dishes, Battersea .....	475	" Valve Jars .....	281
" Toluol, Ostwald .....	393	Robax Glass Tubing .....	260	Sahlb Haemometer .....	265
" and Recorder for Electric Furnaces, Thwing .....	237	Robervall Balance .....	59	Salinometer .....	273
Reichert Metallographic Microscope .....	301	Rock Crystal Apparatus .....	459	Sample Boxes .....	85
" Thermo-regulators .....	536	Rocksalt Lenses .....	504	" Cans for Cement .....	114
Reichert-Novy Thermo-regulator .....	536	Rod, Charging, for Electroscopes .....	462	" Grinders, Braun .....	163
Reichl Filter Apparatus .....	209	" Glass .....	462	Samplers .....	480
Reischauer Specific Gravity Bottle .....	491	" Silica .....	489	Sampler, Cement .....	112
" Water Bath .....	552	" Stirring, of Glass .....	260	Sand, Berkshire .....	552
Reischauer-Brinton Specific Gravity Bottle .....	491	Röhrig Fat Extraction Tube .....	351	Sand Baths .....	480
Reiss Refractometer Tables .....	470	Rose Automatic Adjustable Burette .....	88	" Crucibles .....	157
Relative Photometers .....	385	" Crucible .....	159	" Glasses .....	481
Replica Gratings for Spectroscopy .....	504	Rosenau Syringe Rack .....	516	" Sieves .....	487
Reservoir for Pressure Blowers .....	73	Rosenberger Innoculating Needles .....	364	" Thermometers .....	534
Resistances, Leeds and Northrup, for Electrolytic Work .....	393	Rotameter .....	256	Sapometer .....	88
Resistances, Ruhrstrat .....	203	Rotarex, Dulin .....	17	Saponification Burette .....	88
Resistance Box, Leeds & Northrup .....	394	Rotary Crucible Holder .....	161	" Flask, Volumetric .....	224
" Otto Wolf .....	394	" Microtome, Minot .....	344	Sargent Automatic Gas Calorimeter .....	107
" Bulbs .....	453	Rotating Anode and Stirring Apparatus .....	199	" Electric Drying Oven .....	376
" Thermometers, Platinum .....	453	Rothe Double Automatic Pipette .....	412	" High Temperature Burner .....	93
" Thermometer Recorders, Leeds & Northrup .....	454	Roux Bacteriological Charts .....	125	Sartorius Brain Microtome .....	345
Respiration Apparatus, Jaquet .....	404	" Culture Flask .....	171	" Freezing Microtome .....	345
" Pumps, Artificial .....	402	" Tube .....	172	Saucepans .....	75
" Valves .....	403	" Syringes .....	516	Sauer Charts of Petrography .....	133
Respirators .....	474	" Thermo-regulator, Bimetallic .....	536	Sauveur Metallurgical Microscope .....	298
Respiroscope .....	417	Rowntree-Geraghty Colorimeter .....	144	" Micro-Photographic Apparatus .....	298
Retorts .....	474	R R Alundum .....	149	Saw, Bone .....	182
" Transparent Quartz .....	459	Rubber Bands .....	475	Saxe Areo-Pycnometer .....	273
Retort Adapters .....	1	" Bottles .....	84	Saxe Urino-Pycnometer .....	544
" for Creosote Oil Distillation .....	19	" Bulbs .....	85	Saybolt Universal Viscosimeter .....	371
Revolving Stages, Zeiss .....	320	" Bulbs for Dropping .....	76	Scale, Cement .....	113
Rheostats for Micro Arc Lamps .....	331	" Caps for Dropping Bottles .....	76	" Percentage .....	113
" Projection Apparatus .....	448	" Caps for Test Tubes .....	476	Scale Tester, for Thermometers .....	292
" Ruhrstrat .....	203	" Dam .....	478	Scalpels .....	182
Rhombohedral Model .....	358	" Discs for Foot Blowers .....	73	" "Schälchen" Hofmeister .....	481
Ribbon Carriers for Microtones .....	346	" Extraction Apparatus .....	207	Scheibler Calcemeters .....	99
		" Finger Cots .....	476	" Desiccators .....	175
		" Funnels .....	229	Scheibler-Finkener Calcimeter .....	99
		" Gloves .....	476	Schellbach Burettes .....	87
		" Policemen .....	476	" Support .....	515
		" Spatula .....	490	Schiff Nitrometer .....	367
		" Stopcock .....	510	Schilling Specific Gravity Apparatus for Gas .....	256
		" Stoppers .....	477	Schimmel Molecular Weight Determination Apparatus for Essential Oils .....	373
		" Testing Machine .....	527	Schleicher & Schüll Filter Paper .....	214
		" Tissue .....	478	Schmidt Electrometer .....	462

	Page		Page		Page
Schmidt & Haensch Polariscopes.....	424 to 435	Shelf, Digesting, Kjeldahl.....	364	Sommer Hydrometer for Asphalt.....	17
Schmidt & Haensch Spectroscopes.....	492 to 494	Shells, Diffusion.....	176	Soundness Test Apparatus for Cement.....	112
Schönjahn Grain Germinator.....	262	Shell Vials.....	545	Soxhlet Condenser.....	153
Schopper Conditioning Ovens.....	528	Sherrington-Starling Recording Drum.....	399	" Drying Oven.....	380
" Testing Apparatus.....	525 to 528	Short & Mason Recording Thermometer.....	534	" Extraction Apparatus.....	206
Schroeder Alkalimeter.....	7	Shot, Lead.....	283	" Tube.....	205
Schultz Coagulometer.....	266	Shields, Aluminum, for Centrifuge Tubes.....	115	Spark Coils.....	275
Schultze Micro Warm Stage.....	333	Shovel, Cupel.....	172	Spatulas.....	490
Schulze Stirring Apparatus.....	509	Shunts for Demonstration Galvanometers.....	200	" Platinum.....	422
Schuman Specific Gravity Bottle.....	492	Shutter, Automatic, for Micro-Photographic Apparatus.....	338	Specific Gravity Apparatus, Johnson.....	114
Schuster Dropping Bottle.....	77	Side Neck Flasks.....	223	Specific Gravity Apparatus for Gas, Schilling.....	256
Schutte Penetrometer.....	18	Sidersky Vacuum Oven.....	350	Specific Gravity Balances.....	58
Schwartz Calcium Chloride Tubes.....	100	Siemens Water Pyrometer.....	455	" " Bottles, Barrett-Hubbard.....	491
Schwarzmann Charts of Crystallography.....	133	Sieves.....	486	" " Hydrometers.....	271
Scimateo Patent Burner.....	93	Sieve Bolting Cloth.....	75	Specimens, Tourmaline.....	353
Scissors.....	486	" Shakers.....	487	Specimen Bottles.....	77
" Dissecting.....	183	Sight-Box, Photometer.....	384	" Forceps.....	227
Scleroscope.....	267	Signal Markers.....	401	" Jars.....	276 to 281
Scoops.....	481	Silberschmidt Filter Apparatus.....	210	" Vials.....	545
" with Counterpoise.....	180	Silica Casseroles.....	110	Spectral Objective for Microscope.....	324
Scorifiers, Battersea.....	481	" Combustion Boats.....	149	Spectral Ocular, Abbe.....	324
Scorifier Tongs.....	539	" Tubes.....	149	Spectro-Colorimeter.....	145
Scott Glue Tester.....	361	" Crucibles.....	157, 159, 160	Spectrophotometer, König, with Wanner Pyrometer.....	457
" Viscosimeter.....	270	" Distilling Flask.....	222	Spectroscopes, Spectrographs, Spectrometers, Spectrophotometers and Accessories.....	492 to 506
Screens, Projection.....	448	" Evaporating Dishes.....	179	Spectroscope, Direct Vision, for use with Polariscopes.....	429
Screw Cap Jars.....	281	" Flask.....	219	Spectrum Burners.....	502
" Compressors for Rubber Tubing.....	142	" Muffles.....	364	" Cells.....	504
" Drivers.....	481	" Plates.....	419	" Lamps.....	502
" Testing Microscope.....	294	" Rod.....	489	" Photograph Measuring Microscope.....	293
Sealing Tubing, of Glass.....	258	" Spectrum Tubes.....	505	" Tubes.....	505
" Wax.....	553	" Test Tubes.....	520	Speed Counter, for Electrolysis.....	199
Seck Mills.....	164	" Triangles.....	540	" Indicator, for Centrifuges.....	115
Section Knives.....	347	" Tubing.....	489	" Reducing Gear for Motors.....	363
" Lifters.....	184	Silk Peptone.....	177	Spencer Filter Apparatus.....	160
" Razors.....	347	Silver Crucibles.....	159	" Pipettes.....	413
Sectioning Apparatus for Minerals, Wulff.....	352	" Dishes.....	180	Sphygmocardiograph, Jaquet.....	406
Sector Photometer.....	498	Simplex Ore Crusher.....	163	Sphygmograph, Lehmann.....	407
Sedgewick-Rafter Funnel.....	552	Skidmore Crucible.....	160	Sphygmotonomograph, Uskoff.....	408
Sediment Glasses.....	520	Skim Milk Bottle.....	350	Spiral Hot Water Heater for Refractometers.....	469
Seekers.....	184	Slides, Culture.....	334	Spintharoscope.....	460
Seger Draft Gauge.....	290	" Micro.....	334	Spirometer, Jaquet.....	404
" Pyrometer Cones.....	458	Slide Boxes for Micro Slides.....	335	Sponges.....	506
Selenium Cells.....	481	" Box for Tar Testing.....	18	Spoons.....	506
Separatory Funnels.....	230	" Cabinets.....	336	" Deflagration.....	174
" Funnel for Creosote.....	19	" Forceps.....	328	" Sodium.....	490
" " Tar.....	18	" Labels.....	335	Springs, Watch.....	547
Serological Apparatus.....	21 to 45	" Rules.....	489	Spring Back for Microtome Knives.....	348
" Pipettes.....	413	" Rule, Richmond.....	350	" Manometer.....	400
" Syringes.....	516	Slide Wire Bridges.....	393	" Sputum Bottles.....	506
" Test Tubes.....	521	Sliding Objective Changers, Zeiss.....	324	" Dishes.....	506
" " Tube Supports.....	524	Sling Psychrometer.....	274	" Shakers.....	482
" Water Bath.....	36	Slit Type Ultra-Microscope, Zeiss.....	329	" Tray.....	506
Serum Coagulators, Hearson.....	32, 34	Smalley Extraction Tube.....	205	Squibb Automatic Burette.....	87
" Drying Apparatus.....	193	Smith Ductility Machine.....	16	" Separatory Funnel.....	231
Sets of Dissecting Instruments.....	184	" Fermentation Tube.....	209	" Urinometer.....	544
Set of Pure Resistances for Electrolytic Work, Leeds & Northrup.....	393	Soap, Palm Oil.....	348	Stability Test Apparatus.....	508
Sewage Test Cylinder.....	173	Sodium Presses.....	438	Stages, Mechanical, B. & L.....	316
Shaking Apparatus.....	482 to 485	" Spoon.....	490	" Warm, for Microscopes.....	333
" " for Sieves.....	487	Soil Analysis Flasks.....	218		
" Device for Ostwald Thermostats.....	392	" Balance.....	61		
Sharpener for Cork Borers.....	154	" Borer.....	490		
Shears.....	486	" Thermometer.....	535		
" Cartilage.....	184	Solidimeter.....	273		
Shelf for Pneumatic Troughs.....	423	Solution, Platinizing.....	394		
		Solution Scales.....	59, 60		

	Page		Page		Page
Stage Micrometers, B. & L.	316	Storage Batteries.	66	Supports for Potash Bulbs.	436
"    Zeiss.	324	"    Battery Hydrometers.	273	"    "    Reading Micro-	
Staining Blocks.	507	"    "    Jars.	68	scopes or Read-	
"    Dishes.	507	"    "    Tanks.	511	ing Telescopes.	296
"    Jars.	507	<b>Stormer</b> Viscosimeter	370	"    with Rings.	514
"    Rack.	507	Stoves, Alcohol, Barthel.	98	"    for Spectrum Tubes.	506
"    Tray.	507	"    Gas.	97	"    "    Test Tubes.	522
Stalagmometer, Traube.	266	<b>Straub</b> Tambour.	401	"    Transmission, with	
<b>Stammer</b> Colorimeter and Ac-		<b>Straus</b> Lactic Acid Funnel.	231	Pulleys.	515
cessories.	147	Straw Rings.	512	"    for Weighing Bot-	
Stands, Wood, for Test Tubes.	523	Streak Plates.	419	tles.	553
Stand for Zeiss Anastigmatic		Stretcher for Rubber Tubing.	480	Support Level.	284
Magnifiers.	289	<b>Stricker</b> Micro Warm Stage.	333	"    Rings.	475
Standard Cell, Weston.	396	String Galvanometer, Eintho-		"    "    Tables.	514
Stands for Projection Appara-		ven, Endelmann.	409	<b>Swan</b> Blood Lancet.	267
tus.	448	String Galvanometer, Ein-		Swift B Mill.	165
Steam Boiler.	508	thoven, Cambridge Scientific		Swimming Cups.	515
"    Generator.	508	Inst. Co.	410	Switches for Projection Ap-	
"    Pressure Sterilizers-Au-		Strops.	348	paratus.	448
toclaves.	37, 38	Student Microtome, B. & L.	343	Switch Board for Demonstra-	
"    Sterilizers, Arnold.	41	Suberite Rings.	512	tion of Ohm's Law.	195
Steaming Apparatus for Cem-		Sub-Q Safety Syringe.	516	Switch Boards for Experimen-	
ment.	114	Substage Condensers, B. & L.	315	tal and Quantitative Electro-	
Steel Rule.	290	"    Zeiss.	320	lytic Analysis.	195 to 198
"    Tape Measure.	291	Suction Pumps.	1 to 6, 217, 218	<b>Sy</b> Extraction Apparatus.	206
Stender Dishes.	180	Sugar Dish, for Weighing.	180	"    Flask.	205
Stereo Binoculars, Bausch &		"    Platinum.	421	"    Fumeless Digestion Appa-	
Lomb-Zeiss.	72	"    Flasks.	226	ratus.	366
Stereopticons and Accessories		"    Hydrometers.	273	Syphons.	515
439 to 448		"    Polariscopes.	430	Syracuse Water Glasses.	547
Stereoscope, Reflecting, Zeiss.	326	"    Refractometer.	468	"    516 to 518	
Stereoscopic Camera, Drüner.	326	"    Tables for Refractom-		Syringes.	519
"    Ocular, Abbe.	324	eters.	470	Syringe Needles.	518
Sterilizers, Arnold Steam.	41	"    Thermometer.	535	"    Pipette, Woithe.	414
"    Freas Electric.	40	"    Tube, Hortvet.	542		
"    "    Hearson Electric.	40	"    Weights.	63		
"    "    Automatic		Sulphonation Test Funnel.	231		
Electric		Sulphur Apparatus.	512		
"    Steam.	41	"    Photometer, Parr.	512		
"    Hot Air.	39, 40	"    Turbidimeter.	542		
"    Steam Pressure-Au-		Sulphur and Ammonia Deter-			
toclaves.	37, 38	mination Apparatus for Gas			
"    "    For Syringes, Dis-		Analysis.	249		
secting Instruments,		Sulphuric Acid Drying Tube,			
etc.	36	Vanier.	193		
Sterilizing Boxes for Pipettes.	415	Sulphurous Acid Condenser.	152		
Stew Pans.	75	Supports, without Fittings.	513		
<b>Stewart</b> Counting Apparatus.	155	"    Adjustable.	515		
"    Cover Glass Forceps.	228	"    "    for Physi-			
"    Laetokrit.	116	ological			
Sticks, Meter.	290	Work.	401		
Still, Mercury, Hulett.	297	"    Glass, for Balance			
"    Tar Testing.	18	Levelling Screws.	64		
"    Water.	186 to 189	"    Burette.	90		
Stirrers, Glass.	260	"    for Centrifuge Tubes	524		
"    Glass, for Electrolysis,		"    Condensers.	153		
Fischer.	199	"    "    Conductivity			
"    Mechanical, for Molec-		Cells.	391		
ular Weight Deter-		"    "    Direct Vision			
mination Apparatus.	389	Spectroscopes.	493		
Stirring Apparatus.	509	"    Electrolytic.	198		
"    Device, Luther.	393	"    with Heaters for			
"    Rods, of Glass.	260	Extraction Appara-			
<b>Stoddart</b> Clamps.	142	tus.	208		
<b>Stohmann</b> Volumetric Flasks.	226	"    for Fermentation			
<b>Stokes</b> Pipettes.	413	Tubes.	209 and 524		
"    Stills.	186	"    Funnels.	232		
Stone, Oil.	182	"    Gas Cylinders.	252		
Stoneware Jars.	282	"    Magnifiers, Ad-			
"    Mortars.	362	justable.	313		
Stopclock.	511	"    Mercury Vapor			
Stopcocks.	510	Lamp.	502		
Stopper, Carboy.	110	"    Nessler Tubes.	144		
"    Rubber.	477	"    Pipettes.	416		
Stopwatches.	511				

## T

T Tubes.	541
Table, for Animal Operations.	12
"    Embedding.	348
"    Glass-Blowers.	259
"    Projections Appa-	
ratus.	448
"    Support.	512, 514
Table Microtome, B. & L.	346
Table of International Atomic	
Weights for 1913.	555
"    Magnifications.	322
"    Mendelejeff's Periodic	
System of the Ele-	
ments.	555
"    Metric and English	
Equivalents.	556, 557
"    Size of Image on	
Screen for Various	
Projection Objectives.	447
"    for Sugar Refractometer.	470
"    Ubbelohde.	373
Tabulae Anatomicae.	124
"    Botanicae.	129
Tallquist Haemoglobin Scale.	265
Tambours, Writing.	401
Tanks, for Distilled Water.	511
Tape, Adhesive.	75
Tape Measures.	291
Tar Testing Apparatus, Bar-	
rett Mfg. Co.	18
<b>Tassin</b> Metallographic Micro-	
scope and Camera.	300
<b>Tatin</b> Animal Holder.	12
<b>Teas</b> Extraction Apparatus.	206
Teclu Burner.	93
Tele-Microscope.	296
Telephone for Wheatstone	
Bridge.	393

	Page		Page		Page
Telephone Receiver for Electrolytic Measurements, Leeds & Northrup.....	394	Thermometers, Calorimeter, Platinum Resistance.....	105	Tirill Burner.....	92
Telescopes, Reading.....	296	“ for Creosote Oil.....	19	“ Gas Generator.....	253
Temperature Bulb for Folin Apparatus.....	543	“ Cryoscopes.....	169	Tissue, Rubber.....	478
“ Indicator, Leeds & Northrup.....	452	“ Incubators.....	535	Titration Outfit.....	90
“ Recorders, Leeds & Northrup.....	454	“ Low Temperature.....	533	Titre Test Thermometer.....	535
“ Regulator and Recorder for Electric Furnaces, Thwing.....	237	“ Maximum and Minimum.....	535	Toluol Regulators, Ostwald.....	393
Tenaculum.....	184	“ for Ostwald.....	393	“ Thermometers for Low Temperature.....	533
Terrapin Separator.....	230	“ Pitch Testing.....	18	Tongs, Abderhalden.....	177
Tessar Micro Objective.....	342	“ Platinum Resistance.....	453	“ Cork.....	155
Test Bottles, Milk.....	350	“ Precision.....	531	“ Crucible.....	538
“ Glasses.....	520	“ of Quartz Glass.....	532	“ Cupel.....	539
“ Plates for Polariscopes.....	435	“ Recording.....	534	“ Gas.....	423
“ Tubes.....	520	“ for Viscosimeters.....	373	“ Scorifier.....	539
“ Transparent Quartz.....	459	Thermometer Clamps.....	143	“ Tourmaline.....	353
“ Tube Baskets.....	522	“ Conversion Formula.....	530	Torry & Eaton Cupels.....	172
“ “ Brushes.....	86	“ Reading Device.....	533	Torsion Balances.....	60
“ “ Caps, Rubber.....	476	“ Scale Tester.....	292	“ “ for Cloth Testing.....	529
“ “ Clamps.....	142	“ Tubing.....	260	“ “ Cream Test.....	351
“ “ Cleaner.....	522	Thermo-regulators.....	536	“ Doolittle Viscosimeter.....	371
“ “ Filling Attachment.....	522	“ Ostwald.....	393	Tourmaline Specimens.....	353
“ “ Holder for Ostwald Thermostat.....	392	Thermostats.....	392	“ Tongs.....	353
“ “ Supports.....	522	“ (Incubators).....	33	Towers, Calcium Chloride.....	99
Tester, Air, Woltper.....	7	“ for Low Temperatures.....	285	Trachia Canulae.....	402
“ Fire and Flash Point.....	368	“ (Thermo-regulators).....	536	Tralle Hydrometers.....	273
“ Cloth and Leather.....	525	Thickness Gauge for Paper Testing.....	526	Transfer Pipettes.....	413
“ Glue.....	261	Thiel Melting Point Tube.....	297	Transmission Support with Pulleys.....	515
“ Grain.....	262	Thimbles for Dialyzing.....	176	Transparent Quartz Apparatus.....	459
“ Hardness.....	267	“ “ Abderhalden.....	177	Transpiration Balance.....	418
“ Linen.....	258	“ Extraction.....	205	Transpirograph.....	418
Testers for Paper, Schopper.....	525	Thistle Tubes.....	232	Traube Stalagmometer.....	266
“ “ Water, Dionic.....	553	Thoma Haemacytometer.....	262	Trays.....	538
“ “ Yarn, Schopper.....	526	“ Mixing Pipette.....	263	“ for Micro Slides.....	336
Testing Apparatus for Blood.....	262	Thoma-Metz Haemacytometer.....	265	“ Staining.....	507
“ “ Cement.....	111	Thorn Extraction Apparatus.....	207	“ Sputum Analysis.....	506
“ “ Glue.....	261	Thörner Illumination Tester.....	386	Triangles.....	539
“ “ Milk.....	348	“ Specific Gravity Bottle.....	492	“ Platinum.....	422
“ “ Oils.....	368	Thread Counters.....	288	Trichinoscope.....	540
“ “ Paper, Yarns, Rubber, Cloth, etc., Schopper.....	525	“ Galvanometer, Edelman.....	409	Trip Balance.....	59
“ “ Machines for Cement.....	112	“ Galvanometer, Cambridge Scientific Inst. Co.....	410	Triple Aplanatic Magnifiers.....	287
“ “ Oil.....	373	Thurston Oil Testing Machine.....	373	“ Beam Balance.....	58
“ “ Rubber.....	527	Thury Chronograph.....	139	Tripods.....	541
“ Sieves.....	486	Thwing Temperature Regulator and Recorder for Electric Furnaces.....	237	“ for Spiral Condenser.....	152
Thayer Interval Timer.....	143	“ Total Radiation Pyrometers.....	457	“ Zeiss Anastigmatic Magnifiers.....	289
Theodolite Goniometer, Goldschmidt.....	352	Tiles for Combustion Furnaces.....	236	Tripod Magnifiers.....	287
Thermocouples for Brown Pyrometers.....	450	“ Earthenware.....	538	Troughs, Mercury.....	297
Thermocouple Recorder, Leeds & Northrup.....	455	“ Pill.....	412	“ Pneumatic.....	423
“ Potentiometer, Leeds & Northrup.....	451	Time Markers, Jaquet.....	400	Trowels for Cement Testing.....	114
Thermoelectric Calorimeter, Fery.....	106	“ Pipe.....	412	Tuberculin Syringe, Luer.....	519
Thermographs.....	534	Tincture Press.....	438	“ Record.....	517
Thermometers.....	530 to 534	Tin Boxes.....	85	Tubes, Abderhalden, for Dialyzing.....	177
“ Beckmann.....	533	Tintometer, Lovibond.....	148	“ Alundum.....	7
“ Calorimeter.....	101 to 108	Tips for Blowpipes.....	74	“ Arsenic.....	14
				“ Barometer.....	65
				“ Boiling Point, for Molecular Weight Determination Apparatus.....	389
				“ Bulb Connecting, for Marshall Urea in Blood Apparatus.....	266
				“ Calcium Chloride.....	99
				“ Capillary Electrometer.....	395
				“ Centrifuge.....	115 to 123
				“ Combustion.....	149
				“ “ Platinum.....	421
				“ Connecting for Gas Burettes.....	251
				“ Connecting for Marshall Urea in Blood Apparatus.....	266



[illegible]

	Page		Page		Page
<b>Wasserman Reaction Test</b>		<b>Weston Ammeters, Voltmeters,</b>		<b>Workshop Microscope, Tassin.</b>	300
"    Tubes.....	520	Votammeters, etc.....	201	<b>Woulff Bottles.....</b>	84
"    Safety Pipettes.....	414	Weston Standard Cell.....	396	<b>Wratten &amp; Wainwright Light</b>	
<b>Waste Jars.....</b>	282	<b>Westphal Specific Gravity Balance.....</b>	58	Filters for Micro-Photography.....	342
"    Pail.....	546	<b>Weule Direct Current Arc Lamp</b>		<b>Wratten &amp; Wainwright Photo-</b>	
<b>Watches, Stop.....</b>	511	for Micro-Photographic Ap-		graphic Plates.....	506
<b>Watch Glasses.....</b>	547	paratus.....	340	<b>Wratten &amp; Wainwright Ray</b>	
"    Glass Clamps.....	142	<b>Wheatstone Slide Wire Bridges</b>	393	Filters for Spectroscopy.....	503
"    Springs.....	547	<b>Whipple Ocular Micrometer</b>		<b>Wright Blood Capsules.....</b>	267
<b>Watchmaker's Glasses.....</b>	287	"    Disc.....	316	"    Pipettes.....	267
<b>Water Baths.....</b>	548 to 552	"    Water Examination		<b>Writing Diamond.....</b>	176
"    Abderhalden.....	177	Apparatus.....	552	"    Tambours.....	401
"    "    Serological.....	36	<b>Whitall Tatum Museum Jars.....</b>	277	<b>Wulffng Axial-angle Apparatus</b>	353
"    "    for Vaccine Cultures, Wasserman		<b>White Bacteria Grinding Apparatus.....</b>	166	"    Mineral Sectioning Apparatus.....	352
"    "    Test, etc.....	34	<b>Whitehead Compressor for Liquid Air.....</b>	285	<b>Wurster Hygrometer.....</b>	274
"    Bath and Incubator Combined, for Wasserman Test.....	35	<b>Wiborgh Sulphur Apparatus.....</b>	512		
"    Decomposition Apparatus.....	283	Wicking for Alcohol Lamps.....	283	<b>Y Tubes.....</b>	541
"    Examination Apparatus, Whipple.....	552	<b>Wiesnegg Drying Oven.....</b>	374	<b>Yarn Tester, Schopper.....</b>	526
"    Heaters.....	552	"    Muffle Furnaces.....	235	<b>Yellow Belgian Hones.....</b>	348
"    Heater for Refractometers.....	469	<b>Wiley Extraction Apparatus.....</b>	207	<b>Yocum Extraction Apparatus.....</b>	206
"    Interferometer.....	471	"    Water Bath.....	549		
"    Level Regulator.....	548	<b>Wiley-Richardson Extraction Apparatus.....</b>	207		
"    Motors.....	362	<b>Will-Ventrapp Nitrogen Bulbs</b>	366	<b>Z</b>	
"    Pyrometer, Siemens.....	455	<b>Williams Gas Analysis Apparatus.....</b>	246	<b>Zabriskie Clamp for Minot Precision Microtome.....</b>	344
"    Sample Bottles.....	84	<b>Wilson Electroscopes.....</b>	463	<b>Zappert Haemacytometer.....</b>	264
"    Sampling Apparatus, Es-march.....	553	<b>Wine Tester, Dujardin-Salleron</b>	194	<b>Zeiss Adjustable Oculars.....</b>	264
"    Stills.....	186	<b>Wingen Illuminometers.....</b>	386	"    Anastigmatic Magnifiers.....	288
"    Tanks.....	511	<b>Winkler Gas Collecting Tube.....</b>	251	"    Autocollimation Spectro-scope.....	500
"    Tester, Dionic.....	553	"    "    Pipette.....	256	"    Binocular Microscope.....	325
<b>Watering Flask.....</b>	226	"    Potash Bulb.....	436	"    Comparison Spectroscope.....	501
<b>Wavelength Spectrometer.....</b>	495	<b>Winkler-Kyll Potash Bulb.....</b>	436	"    Crystallographic Micro-scope.....	330
<b>Wax, Sealing.....</b>	553	<b>Wire Basket for Autoclaves.....</b>	37	"    Grating Spectroscope.....	499
"    Pencils.....	382	"    "    "    Test Tubes.....	522	"    Haemacytometers.....	262
<b>Weatherhead Crusher.....</b>	161	"    Gauge.....	258	"    Interferometers.....	471
<b>Weber Photometers.....</b>	383	"    Gauze, Platinum.....	422	"    Measuring Microscope.....	295
"    Photometer Bench.....	384	"    Platinid, for Inoculating Needles.....	364	"    Micro-Photographic Apparatus.....	340
"    "    Raumwinkelmesser.....	386	"    Platinum.....	420	"    Microscopes and Accessories.....	318
"    Relative Photometer.....	385	"    Triangles.....	539	"    Micro Arc Lamp.....	331
<b>Wedgewood Mortars.....</b>	362	<b>Wislicenus Atom Configuration Models.....</b>	19	"    Refractometers.....	465
<b>Weichardt Hygienic Pipette.....</b>	414	<b>Witt Filtering Apparatus.....</b>	209	"    Spectrograph.....	500
<b>Weidanz Test Tube Support.....</b>	524	"    Laboratory Press.....	438	"    Ultra-Microscopes.....	329
<b>Weighing Bottles.....</b>	553	<b>Woithe Syringe Pipette.....</b>	414	"    Ultra-Violet Micro-Photographic Outfit.....	341
"    Dishes.....	180	"    Test Tube Supports.....	524	<b>Zinc Tube, Vanier.....</b>	193
"    Scoops.....	481	<b>Wolf Object Holder.....</b>	289	<b>Zittel and Haushofer Paleontological Charts.....</b>	132
<b>Weights, Assay Ton.....</b>	63	<b>Wolf Resistance Box.....</b>	394	<b>Zittel-Pompeckj-Salfeld Pale-ontological Charts.....</b>	133
"    for Balances.....	62	<b>Wolffhuegel Counting Apparatus.....</b>	155	<b>Zoological Charts, Leuckart-Chun.....</b>	134
"    Fractional.....	64	<b>Wollny Thermometer.....</b>	466	<b>Zuntz Kymographs.....</b>	399
"    for Sugar Analysis.....	63	<b>Wolpert Air Tester.....</b>	7		
<b>Weiss Glue Testing Apparatus.....</b>	261	<b>Wool, Glass.....</b>	261		
<b>Welsbach Micro Lamps.....</b>	331				

**The Wabtel Press**  
WILLIAMS & WILKINS COMPANY  
BALTIMORE, U. S. A.

# REAGENTS

FOR

## ANALYSIS, BACTERIOLOGY, MICROSCOPY, ETC.

BAKER ANALYZED

MERCK BLUE LABEL

KAHLBAUM CERTIFIED FOR ANALYSIS

### PART II—REAGENTS

COPYRIGHT, 1914

BY ARTHUR H. THOMAS COMPANY

EDITION SEPTEMBER 1914

ARTHUR H. THOMAS COMPANY

WEST WASHINGTON SQUARE

(230-2-4 SOUTH 7th ST.)

PHILADELPHIA

U. S. A.



Our experience has shown us that no chemist wishes to confine his purchases of high grade reagents for analytical purposes to those produced by any one manufacturer.

The advantage of placing orders with a dealer offering the three most reliable lines of analyzed and tested reagents is, therefore, obvious in that the products of various manufacturers can be purchased at one time, on one order and received in one shipment.

Where competitive bids on high grade reagents are required the customer will please specify the maker whose goods are preferred, using such maker's nomenclature as to purity, size of package, etc.

It is impossible to make intelligent competitive bids upon specifications such as "Kahlbaum, Merck or Baker" "all chemicals to be c.p." "all chemicals to be of highest grade" "Kahlbaum c.p." "Merck c.p." as no two bidders will quote on the products of the same maker for each of the items in the list and also because both Merck and Kahlbaum omit entirely the use of the designation c.p.

We believe that the responsibility as to the choice of maker belongs to the buyer rather than to the dealer and that such responsibility should be assumed by the buyer when preparing lists for competitive bids. This does not apply, however, in quoting upon goods of ordinary grade carried in stock in bulk and packed in quantities as desired.

## PREFACE

In this price list we offer in original factory packages three leading makes of tested reagents. i. e., BAKER ANALYZED, MERCK BLUE LABEL and KAHLBAUM'S CERTIFIED FOR ANALYSIS, and, in addition, less expensive chemicals carefully selected to meet less exacting requirements. These are secured from reliable factories in both Europe and America, and in most cases, are distinctly superior to the ordinary so-called "commercial" grade.

The chemicals herein listed are those which have been most frequently ordered from our stock in the past fourteen years as shown by carefully kept records during this period. We have not attempted to include all the chemicals which may be required in modern laboratory work, particularly in the line of organic preparations which our experience has shown to be demanded mostly by buyers entitled to duty free importation for educational use, and which we furnish in most cases by direct importation from Europe upon orders made out from manufacturer's price list. Chemicals not in stock are secured promptly and economically from specified or best available makers.

Stains and reagents required in Bacteriology, Microscopy and other of the Biological Sciences have been given special attention and our list is offered as being unusually complete in this direction.

**DUTY FREE IMPORTATION.** Buyers entitled by law to duty free importation are encouraged to secure from us the original catalogues of the European makers such as Kahlbaum, Marquart, Schuchardt, DeHaen, etc. Duty free quotations on products of the European factory of E. Merck must be made specially as this firm does not permit the distribution of their German catalogue in the United States. Our facilities for prompt and economical duty free importations are the result of years of effort and insure the buyer lower cost and less trouble than when orders are placed directly with the European manufacturers. **Parallel, competitive bids for duty free importation cannot be accurately made unless the buyer specifies the exact grade of chemical desired in terms of the maker's price list.**

**CONTAINERS.** Containers are charged for extra at price indicated in marginal column except where designation "incl." is given, in which case the container cost is included in the cost of the chemical. Our designations for containers in the marginal column are as follows:—

cb. Cork stoppered bottle.	cn. Tin can.
gb. Glass stoppered bottle.	bx. Box.
rb. Rubber stoppered bottle.	jjg. Jug.
cc. Cylindrical carton.	

We emphasize the convenience of our cylindrical, paraffined card-board cartons in which many of our ordinary chemicals are furnished. They are much superior to the paper bag in common use and provide a suitable container until contents are used. We allow credit, if returned to us charges paid in clean condition, for five pint and one pound acid bottles and carboys, when original purchase has been made from us and containers bear our label. Other glass stoppered bottles, and cork stoppered bottles are not returnable for credit. Arrangements are made with those regularly buying Baker's acids and ammonia of us for the direct shipment of containers to the factory at Phillipsburg, N. J.

**SHIPMENT RESTRICTIONS.** Under United States laws and regulations established by the Interstate Commerce Commission, certain chemicals are prohibited from express shipment and must in all cases be shipped by freight. These are indicated by an asterisk thus (\*). Chemicals designated thus (\*) are accepted by express companies under definite restrictions as to quantity, size of package, method of packing, etc. As all of these restrictions are without our control we accept all orders and make all contracts subject to them and charge extra for all extra packing expenses as required by the above mentioned regulations.

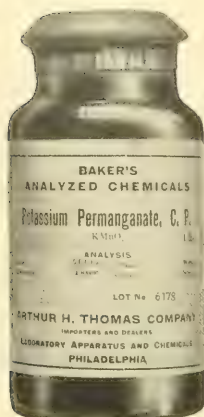
**TERMS AND PRICES.** All prices are subject to change without notice. With the exception of Baker's Analyzed Chemicals on which we extend special net prices considerably less than the printed list, the prices in this catalogue may be generally taken as net. It has been found impracticable to quote a uniform discount rate because of price fluctuations. Special prices will be extended on large quantities of single items or on large general lists.

We are not manufacturers of chemicals but are dealers and importers. Our function is to afford scientists an economical and convenient source of supply for the chemicals they most frequently require, no matter where or by whom they are manufactured, and, in the case of the purest grades of chemicals to deliver in the manufacturer's original packages so that full responsibility as to quality rests definitely upon the manufacturer, where it belongs. Chemicals are freely added to our price list and carried in stock when demand develops or our attention is called to future need.

## BAKER, MERCK AND KAHLBAUM

## ANALYZED, STANDARDIZED AND CERTIFIED

## REAGENTS FOR ANALYSIS



BAKER BOTTLE



MERCK BOTTLE



KAHLBAUM BOTTLE

**BAKER ANALYZED CHEMICALS**—In making the analysis samples are taken 50 or 100 lbs. of material and tests are made for all probable impurities. Each lot is numbered and every package filled from the lot bears the lot number so that the contents of any package can be identified and traced back through the entire process of manufacture. When impurities are found and can be determined quantitatively the amount is stated in percentages. The minus sign (—) means that the amount of impurity is less than is indicated by the figures, the term "None" that no appreciable amount of the impurity tested for has been found in the sample. The term "Trace" indicates the presence of a minute amount of impurity only detectable by qualitative methods. The analyses given throughout the catalogue are intended as typical and goods furnished are not guaranteed to be exactly in accordance with these analyses.

**MERCK BLUE LABEL REAGENTS**—These reagents are standardized as well as analyzed as each reagent must conform to the standard of purity given in Krauch's *"Chemical Reagents, Their Purity and Tests"* before packing under the Blue Label. The standard of purity given on the printed label and under each item throughout this catalogue is, therefore, absolutely guaranteed. A reagent under Merck's Blue Label is, therefore, standard at all times so long as it is delivered in the original package. The distinctive Blue Label is used on these tested and standardized reagents in contradistinction to the White Label as used on Merck photographic, medical and technical chemicals. To avoid confusion and mistakes customers will kindly use the term "Merck Blue Label" or "M.B.L." in ordering these goods.

**KAHLBAUM CERTIFIED FOR ANALYSIS REAGENTS**—These reagents are high in price but embody a degree of purity offered by no other maker as will be seen by comparison of the analyses printed under each substance. The method of analysis, i.e. amount of impurity present in a definite weighable quantity, has commended itself to those interested in using reagents of highest possible purity. These reagents are listed in the Kahlbaum German price-list as "zur Analyse, mit Garantieschein" and are more expensive than those listed under the designation "zur Analyse." A quantity of 10 grams is used for each analysis and the statements on the labels are based on the following explanation:—

Spur (trace)	=	less than $\frac{1}{100}$ milligram	} in 10 grams of material
Kaum Spur (slight trace)	=	" " $\frac{2}{100}$ "	
Hauch (faint trace)	=	" " $\frac{5}{100}$ "	

The bottles are all sealed with lead in the Kahlbaum factory and in addition to the statement on each label a printed guarantee is furnished with each package. There may be a slight variation in the amount of impurity shown by the analysis on packages sent out from different lots but this variation is always exceedingly slight. We keep on hand for free distribution a supply of Kahlbaum's latest price list for the use of customers placing import orders, particularly those for Educational Institutions, which may be imported free of duty.

SECTION I  
CHEMICALS

	Maker or Brand	Ounce and pound prices			Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.
°ACETAMIDE		.40	gb .06	5.00	gb .12		
°ACETONE, technical				.30	cb .09	1 gal.	1.50 cn .25
°ACETONE, c. p.	Baker Analyzed			.70	cb .03	¼ lb.	.20 incl
Sp. gr.	790						
B. P.	55.5°-57.5°						
Nonvolatile matter	.902%						
Aldehyde	none						
°ACETONE	Merck Blue Label	.70	incl			¼ lb.	.25 incl
Tested for	solubility in water						
Residue on evaporation, less than 0.0025%							
Acids	none						
Aldehydes	none						
Substances oxidizable by Permanganate	none						
Water	less than 3%						
°ACETYL Chloride, c. p.	Baker Analyzed	.50	incl				
°ACID, Acetic, coml., 28%				.10	cb .09	5 lb.	.45 cb .20
° " Acetic, pure, 30%	Baker Analyzed			.11	gb .15	5 lb.	.50 gb .25
° " Acetic, pure, 50%	Baker Analyzed			.15	gb .15	5 lb.	.70 gb .25
° " Acetic, pure, 80%	Baker Analyzed			.18	gb .15	5 lb.	.85 gb .25
° " Acetic, pure, 99.0-99.5%	Baker Analyzed			.20	gb .15	5 lb.	.95 gb .25
° " Acetic, c. p., 30%	Baker Analyzed			.20	gb .15	5 lb.	.95 gb .25
° " Acetic, c. p., 50%	Baker Analyzed			.20	gb .15	5 lb.	.95 gb .25
° " Acetic, c. p., 80%	Baker Analyzed			.25	gb .15	5 lb.	1.20 gb .25
° " Acetic, c. p., 99.0-99.5%	Baker Analyzed			.30	gb .15	5 lb.	1.45 gb .25
Sp. gr.	1.058						
Nonvolatile matter	.0001%						
Fe	.0001%						
SO <sub>2</sub>	none						
Empyreuma	trace						
°ACID, Acetic, c. p., special, 99.7-99.9%	Baker Analyzed	.50	gb .15				
Empyreuma (Bichromate test one-half hour)	none						
° " Acetic, c. p., for shellac analysis	Baker Analyzed	.50	gb .15				
CH <sub>3</sub> COOH	98.9-99.1%						
M. P.	14.7-15°C						
Empyreuma	none						
°ACID, Acetic, diluted, 30%	Merck Blue Label	.50	incl				
The same impurities as the 99.4%							
° " Acetic, 36%	Merck Blue Label	.50	incl				
The same impurities as the 99.4%							
° " Acetic, 90%	Merck Blue Label	.80	incl			¼ lb.	.30 incl
The same impurities as the 99.4%							
° " Acetic, 96%	Merck Blue Label	.80	incl			¼ lb.	.30 incl
The same impurities as the 99.4%							
° " Acetic, 99.1%	Merck Blue Label	.80	incl			¼ lb.	.30 incl
Nonvolatile matter	less than 0.0004%						
Hydrochloric Acid	0.0003% as Cl						
Sulphuric Acid	less than 0.00001% as SO <sub>2</sub>						
Heavy metals	none						
Iron	less than 0.0001%						
Earths	less than 0.003% as Ca						
Formic Acid	less than 0.05%						
Sulphurous Acid	less than 0.4% as SO <sub>2</sub>						
Substances reducing Permanganate and other empyreumatic bodies	none						
°ACID, Acetic, 98-100% (conforming to the Dichromate test)	Merck Blue Label	1.50	incl			¼ lb.	.50 incl
Substances reducing Dichromate solution in one-half hour	none						
° " Acetic Anhydride, c. p.	Baker Analyzed	.15	incl	1.50	gb .15	¼ lb.	.45 incl
Nonvolatile matter	.001%						
Cl	trace						
°ACID, Acetic Anhydride	Merck Blue Label	.30	incl			½ lb.	1.30 incl
Hydrochloric Acid	less than 0.002% as Cl						
Nonvolatile matter	less than 0.005%						
°ACID, Arsenic, coml., powder	Baker Analyzed	.60	cb .06			¼ lb.	.7 incl
" Arsenious, c. p., powder	Baker Analyzed	.10	incl	.35	cb .06	¼ lb.	.15 incl
Nonvolatile matter	.035%						
Fe	.005%						
CaO	none						
SO <sub>2</sub>	trace						
°ACID, Arsenious, lumps or powder	Merck Blue Label	.40	incl			¼ lb.	.20 incl
Nonvolatile matter	less than 0.03%						
Barium Sulphate, Talcum, Calcium Sulphate, etc.	none						
Arsenic Sulphide	less than 0.0005% as S						
°ACID, Arsenious, glassy	Kahlbaum "C.f.A."					100 grm.	.50 incl
" Arsenious, glassy	Kahlbaum "C.f.A."					500 grm.	.85 incl
Nonvolatile matter	none						
Arsenic Sulphide	none						
Solubility in Ammonia	clear						
Content	99.99%						



		Ounce and pound prices				Price in other size packages		
		per oz.		per lb.		size pkg.	per pkg.	cont.
		cont.		cont.				
ACID,	Arsenious, powdered.....	Kahlbaum "C.f.A.".....				100 grm.	.85	incl
"	Arsenious, powdered.....	Kahlbaum "C.f.A.".....				500 grm.	.85	incl
"	Nonvolatile matter.....	trace		in 10		Certified Analysis		
Content.....	99.99%							
ACID,	Benzoic (from Toluene).....	Baker Analyzed.....		.43	cc .05			
"	Benzoic (from Toluene).....	Baker Analyzed.....		.10	incl .55	cb .12	1/4 lb. .15	incl
"	Boric, crystals.....					.15	cc .05	
"	Boric, powdered.....					.15	cc .05	
"	Boric, c. p., crystals.....	Baker Analyzed.....		.10	incl .25	cb .09	1/4 lb. .15	incl
"	Boric, c. p., powder.....	Baker Analyzed.....		.10	incl .30	cb .09	1/4 lb. .15	incl
	Fe.....	.0005%						
	CaO.....	none						
	Na (flame test).....	trace						
	Pb.....	none						
	C.....	none						
	SiO <sub>2</sub> .....	none						
ACID,	Boric, c. p., fused, and yel. powd.....			1.50	cb .08			
"	Boric, fused.....	Kahlbaum "C.f.A.".....				50 grm.	.70	incl
"	Boric, fused.....	Kahlbaum "C.f.A.".....				200 grm.	1.80	incl
	Alkalies.....	unweighable						
	Silica.....	unweighable						
	Earths, etc.....	unweighable						
Content.....	99.10%							
	Hygroscopic moisture.....	remainder						
ACID,	Boric Anhydride.....	Merck Blue Label.....		.25	incl			1 1/2 lb. 1.35 incl
	Silica, Alkalies, etc.....	less than 0.01%						
"	Butyric, c. p., 100%.....			.15	incl 1.50	cb .08	1/4 lb. .50	incl
"	Carbolic, pure, white crystals.....					.25	cb .09	
"	Carbolic, c. p., loose crystals.....					.50	gb .15	
"	Carbolic, c. p., loose crystals.....	Baker Analyzed.....				.60	cb .09	
	Nonvolatile matter.....	.001%						
	M. P.....	38°-39°C						
	B. P.....	152°C						
	Soluble in 15 parts of water.....							
ACID,	Carbolic, by synthesis, fused.....					.80	gb .15	1 1/4 lb. .30 incl
ACID,	Carbolic, crude, § 100.....	As recommended by Drs. Mall and Keiller for the preservation of cadavers. In bbls. of 50 gals. at 65¢ per gal.		A. H. T. Co. § 100.....				bbl. 32.50 incl
ACID,	Carminic.....	Merck Blue Label.....		5.50	cb .04			15 grs. .40 incl
"	Carminic.....	Merck Blue Label.....						15 grs. .70 incl
"	Carminic.....	Merck Blue Label.....						1/2 oz. 2.00 incl
"	Tested for.....	solubility and sensitiveness						
"	Chromic, coal.....					.35	gb .15	
"	Chromic, pure.....					.50	gb .15	
"	Chromic, c. p.....	Baker Analyzed.....		.20	incl 1.50	gb .15	1/4 lb. .55	incl
	SO <sub>2</sub> .....	.034%						
	HNO.....	trace						
	K.....	trace						
	Na.....	trace						
	CaO.....	trace						
	Fe.....	.002%						
ACID,	Chromic, free from H <sub>2</sub> SO <sub>4</sub> .....	Merck Blue Label.....		.25	incl			1 1/2 lb. 1.00 incl
	Sulphuric Acid.....	less than 0.005% as SO <sub>3</sub>						
	Potassium Sulphate and Chromate.....	not more than 1%						
ACID,	Chromic, for Carbon determination.....	Merck Blue Label.....		1.25	incl			1 1/4 lb. .40 incl
"	Tested for.....	Carbon						
"	Cinnamic, c. p.....			.35	incl			
"	Citric, crystals, or powder.....					.75	cc .05	
"	Citric, c. p., crystals.....	Baker Analyzed.....		.15	incl 1.00	cb .08	1/4 lb. .40	incl
"	Citric, c. p., powd.....	Baker Analyzed.....		.15	incl 1.10	cb .08	1/4 lb. .40	incl
	Nonvolatile matter.....	0.003%						
	SO <sub>2</sub> .....	none						
	CaO.....	trace						
	Pb.....	trace						
	Fe.....	0.005%						
	Oxalic Acid.....	trace						
	Tartaric Acid.....	none						
ACID,	Citric.....	Merck Blue Label.....		1.25	incl			1/4 lb. .40 incl
	Oxalic Acid.....	less than 2.8%						
	Tartaric Acid.....	less than 1%						
	Sugar.....	less than 0.05% Saccharose						
	Sulphuric Acid.....	less than 0.002% as SO <sub>3</sub>						
	Lead.....	less than 0.001%						
	Calcium.....	less than 0.01%						
	Nonvolatile matter.....	less than 0.05%						
ACID,	Dichloroacetic.....			1.40	gb .07			
"	Formic, pure, 85%.....					.75	gb .15	
"	Formic, c. p.....			.22	incl 1.25	gb .15	1/4 lb. .40	incl
ACID,	Gallic, U. S. P.....			.10	incl	.70	cb .10	

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>ACID, Gallic</b> .....	<b>Merck Blue Label</b>							
Tested for.....								
Water content.....								
Sulphuric Acid.....								
Inorganic matter.....								
<b>ACID, Hydriodic, c. p., sp. gr. 1.50</b> .....		.40	incl					
<b>Hydriodic, sp. gr. 1.50</b> .....	<b>Merck Blue Label</b>	.60	incl			¼ oz.	.25	incl
Nonvolatile matter.....								
Phosphorus.....								
Sulphuric Acid.....								
Heavy metals.....								
Earths.....								
Hydrochloric Acid and								
Hydrobromic Acid.....								
<b>ACID, Hydriodic, sp. gr. 1.70</b> .....	<b>Merck Blue Label</b>	1.00	incl			¼ oz.	.35	incl
Same impurities as sp. gr. 1.50								
<b>Hydrobromic, sp. gr. 1.31</b> .....		.25	incl	1.35	gb .15	¼ lb.	.50	incl
<b>Hydrobromic, sp. gr. 1.38</b> .....	<b>Merck Blue Label</b>	.25	incl			¼ lb.	.60	incl
Nonvolatile matter.....								
Arsenic.....								
Sulphuric Acid.....								
Heavy metals.....								
Iron.....								
Hydrochloric Acid.....								
Hydrobromic Acid.....								
Phosphorous and Phosphoric								
Acids.....								
Calcium.....								
<b>*ACID, Hydrochloric, coml., pale, in 6 lb.</b>								
bottle.....				.05		6 lbs.	.30	gb .25
<b>Hydrochloric, coml., pale, in case</b>								
of 10 glass stoppered								
bottles.....				.04		60 lb.	2.40	3.30
<b>Hydrochloric, coml., pale, in carboy</b>				.02½		118 lb.	3.54	2.00
<b>Hydrochloric, c. p., sp. gr. 1.18-1.19</b>	<b>Baker Analyzed</b>			.14	gb .15			
<b>Hydrochloric, c. p., in 6 lb. bottle</b>	<b>Baker Analyzed</b>			.09		6 lbs.	.54	gb .25
<b>Hydrochloric, c. p., in case of 10</b>								
glass stoppered bot-								
ties.....	<b>Baker Analyzed</b>			.08		60 lb.	4.80	3.30
<b>Hydrochloric, c. p., in carboy</b>	<b>Baker Analyzed</b>			.07½		112 lb.	8.40	2.00
Sp. gr.....								
HCl.....								
Free Cl.....								
Fe.....								
As.....								
Sb.....								
Nonvolatile matter.....								
<b>*ACID, Hydrochloric, c. p.</b> .....	<b>Baker Special</b>	.15				6 lb.	.90	gb .25
(Free from Arsenic and Antimony)								
<b>Hydrochloric, sp. gr. 1.190</b> .....	<b>Merck Blue Label</b>	.40	incl			6 lb.	1.80	incl
Sulphuric Acid.....								
Nonvolatile matter.....								
Free Chlorine.....								
Sulphurous Acid.....								
Heavy metals.....								
Iron.....								
Calcium.....								
Arsenic.....								
<b>Hydrochloric, sp. gr. 1.050</b> .....	<b>Merck Blue Label</b>	.40	incl			6 lb.	1.80	incl
The same impurities as sp. gr. 1.190								
<b>Hydrochloric, sp. gr. 1.124</b> .....	<b>Merck Blue Label</b>	.40	incl			6 lb.	1.80	incl
The same impurities as sp. gr. 1.190								
<b>ACID, Hydrofluoric, tech., 48%</b> .....		.13				5 lb.	.65	½ 1.25
<b>Hydrofluoric, tech., 48%</b> .....		.13				10 lb.	1.30	½ 2.00
<b>Hydrofluoric, pure</b> .....		.10	incl	.70	incl	¼ lb.	.25	incl
<b>Hydrofluoric, c. p.</b> .....	<b>Baker Analyzed</b>	.20	incl	1.25	incl	¼ lb.	.50	incl
<b>Hydrofluoric, c. p.</b> .....	<b>Baker Analyzed</b>					½ lb.	.76	incl
H.F.....								
SO <sub>2</sub> .....								
SiO <sub>2</sub> .....								
HCl.....								
Fe.....								
Ph.....								
Nonvolatile matter.....								
<b>ACID, Hydrofluoric</b> .....	<b>Merck Blue Label</b>	.55	incl			½ lb.	1.75	incl
Nonvolatile matter.....								
Sulphuric Acid.....								
Calcium.....								
Magnesium.....								
Heavy metals.....								
Hydrochloric Acid.....								
Hydrosilicofluoric Acid.....								
Sulphurous Acid.....								
<b>ACID, Hydrosilicofluoric, tech., 10% (Hydrofluosilicic)</b> .....		.46	gb .14					
<b>Hydrosilicofluoric, c. p.</b> .....		1.85	incl					

		Ounce and pound prices				Price in other size packages			
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.	incl
ACID, Hydrosilicofluoric	Merck Blue Label	.30	incl			1/4 lb.	.75		incl
Nonvolatile matter..... less than 0.05%									
Heavy metals..... none									
Sulphuric Acid..... less than 0.028% as SO <sub>3</sub>									
ACID, Iodic, c. p., crystal	Merck Blue Label	.90	incl			1/4 oz.	.40		incl
Tested for..... solubility									
Nonvolatile matter..... less than 0.025%									
ACID, Iodic Anhydride, c. p.	Merck Blue Label	1.25	incl						
(Iodine Pentoxide)									
ACID, Iodic Anhydride	Merck Blue Label	1.10	incl						
The same impurities as Acid Iodic									
ACID, Lactic, pure, sp. gr. 1.20				.75 cb	.08				
ACID, Lactic, c. p., sp. gr. 1.21		.15	incl	1.00 cb	.08	1/4 lb.	.30		incl
ACID, Molybdic, c. p., 85%	Baker Analyzed	.55	incl	5.00 cb	.07	1/4 lb.	1.75		incl
MoO <sub>3</sub> ..... 85%-87%									
NH <sub>3</sub> ..... 11%									
As..... none									
P..... none									
Nitrate..... none									
Residue insoluble in Ammonia..... trace									
ACID, Molybdic	Merck Blue Label	.40	incl			1/2 lb.	2.50		incl
Tested for..... solubility in Ammonia									
Heavy metals..... none									
Phosphoric Acid..... less than 0.0005% as P <sub>2</sub> O <sub>5</sub>									
ACID, Molybdic, pure, for analysis	Marquart			5.75 cb	.09				
ACID, Molybdic, c. p., special, 100%	Baker Analyzed	.80	incl	7.50 cb	.07	1/4 lb.	2.50		incl
MoO <sub>3</sub> ..... 99.9%									
NH <sub>3</sub> ..... none									
As..... none									
P..... none									
Residue insoluble in Ammonia..... trace									
ACID, Molybdic Anhydride, free from Ammonia and Nitric Acid	Merck Blue Label	.60	incl			1/4 lb.	2.00		incl
Tested for..... solubility in Ammonia									
Alkalies..... none									
Ammonium salts..... less than 0.0033% as NH <sub>3</sub>									
Heavy metals..... none									
Phosphoric Acid..... less than 0.0005% as P <sub>2</sub> O <sub>5</sub>									
Nitric Acid..... less than 0.0032% as N <sub>2</sub> O <sub>5</sub>									
ACID, Molybdic, free from Ammonia	Marquart			7.25 cb	.09				
ACID, Monochloroacetic				1.50	incl				
ACID, Monochloroacetic, c. p.				1.75 gb	.15				
ACID, Naphthylaminesulphonic, (α) tested reagent	Merck Blue Label	.60	incl			1/4 oz.	.25		incl
* ACID, Nitric, coml., 38°, in 7 lb. bottle						7 lb.	.70 gb	.25	
* ACID, Nitric, coml., 38°, in case of 10 glass stoppered bottles				.07 1/2		70 lb.	5.25	3.30	
* ACID, Nitric, coml., 38°, in carboy				.06 1/2		139 lb.	9.04	2.00	
* ACID, Nitric, c. p., sp. gr. 1.42	Baker Analyzed			.17 gb	.15				
* ACID, Nitric, c. p., in 7 lb. bottle	Baker Analyzed			.12		7 lb.	.84 gb	.25	
* ACID, Nitric, c. p., in case of 10 glass stoppered bottles	Baker Analyzed			.11		70 lb.	7.70	3.30	
* ACID, Nitric, c. p., in carboy	Baker Analyzed			.10		139 lb.	13.90	2.00	
Sp. gr..... 1.415-1.42									
HNO <sub>3</sub> ..... 68%-70%									
SO <sub>3</sub> ..... none									
NO..... none									
Fe..... 0.0002%									
I..... none									
Nonvolatile matter..... 0.0005%									
Cl..... none									
As..... none									
Sb..... none									
* ACID, Nitric, pure, sp. gr. 1.52 fuming				.15 gb	.15				
* ACID, Nitric, c. p., sp. gr. 1.50	Baker Analyzed			.25 gb	.15				
HNO <sub>3</sub> ..... 95%-96%									
NO..... none									
Cl..... 0.0003%									
SO <sub>3</sub> ..... 0.0001%									
I..... 0.0002%									
Nonvolatile matter..... 0.0005%									
* ACID, Nitric, pure, sp. gr. 1.60, red fuming				.40 gb	.15				
* ACID, Nitric, c. p., sp. gr. 1.60, red fuming	Baker Analyzed			.50 gb	.15				
ACID, Nitric, sp. gr. 1.153	Merck Blue Label			.40	incl	7 lb.	2.10		incl
The same impurities as sp. gr. 1.40									
ACID, Nitric, sp. gr. 1.20	Merck Blue Label			.40	incl	7 lb.	2.10		incl
The same impurities as sp. gr. 1.40									

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
*ACID, Nitric, sp. gr. 1.30	Merck Blue Label			.40	incl	7 lb.	2.10	incl
The same impurities as sp. gr. 1.40								
*ACID, Nitric, sp. gr. 1.40	Merck Blue Label			.40	incl	7 lb.	2.10	incl
Nonvolatile matter.....less than 0.0047%								
Sulphuric Acid.....less than 0.0005% as SO <sub>2</sub>								
Hydrogen halogen acids.....less than 0.000015% as Cl								
Heavy metals.....none								
Earths.....less than 0.0002% as Ca								
Iodic Acid and Iodine.....less than 0.0005% as I								
Arsenic.....less than 0.000005%								
*ACID, Nitric, fuming, sp. gr. 1.486-1.500	Merck Blue Label			.50	incl			
The same impurities as sp. gr. 1.40								
“ Nitric, crude, sp. gr. 1.38	Merck Blue Label			.40	incl			
Nonvolatile residue.....less than 0.007%								
ACID, Oleic, pure				.30	cb .09			
“ Osmic						1 gm.	1.90	incl
“ Osmic						½ gm.	1.00	incl
“ Oxalic, coml., crystals				.16	cb .05	5 lb.	.70	incl
“ Oxalic, pure	Baker Analyzed			.20	cb .09			
“ Oxalic, c. p.	Baker Analyzed			.45	cb .08	¼ lb.	.20	incl
Nonvolatile matter.....0.040%								
SO <sub>2</sub> .....less than 0.001%								
CaO.....0.001%								
Fe.....0.002%								
Pb.....none								
ACID, Oxalic, c. p., (carefully dried for standardizing)	Baker Special	.15	incl	.75	cb .09	¼ lb.	.35	incl
“ Oxalic	Merck Blue Label			.70	incl	¼ lb.	.25	incl
Ash.....less than 0.017%								
Sulphuric Acid.....less than 0.004% as SO <sub>2</sub>								
Chlorides.....less than 0.0004% as Cl								
Heavy metals.....none								
Ammonium compounds.....less than 0.002% as NH <sub>3</sub>								
Nitric Acid.....less than 0.007% as N <sub>2</sub> O <sub>5</sub>								
ACID, Oxalic	Kahlbaum “C.f.A.”					100 grm.	.90	incl
“ Oxalic	Kahlbaum “C.f.A.”					500 grm.	2.50	incl
Nonvolatile matter.....none								
Chlorine.....none								
Sulphuric Acid.....none								
Nitric Acid.....none								
Ammonium salts.....none								
Heavy metals.....none								
Content.....99.90%								
*ACID, Perchloric	Merck Blue Label	.35	incl					
Nonvolatile matter.....less than 0.005%								
Sulphuric Acid.....less than 0.005% as SO <sub>2</sub>								
Hydrochloric Acid.....less than 0.0005% as Cl								
Barium.....less than 0.0025%								
Heavy metals.....none								
ACID, Phosphomolybdic, c. p., 10% sol.		.20	incl	1.35	gb .15	¼ lb.	.60	incl
“ Phosphomolybdic, crystals		.65	cb .04					
“ Phosphomolybdic, crystals	Merck Blue Label	.90	incl			¼ oz.	.30	incl
Tested for.....solubility								
Heavy metals.....at most a trace								
Earths.....less than 0.02% as Ca								
ACID, Phosphoric, c. p., 85%	Baker Analyzed	.15	incl	.40	gb .15	¼ lb.	.25	incl
Sp. gr.....1.71								
SO <sub>2</sub> .....0.005%								
HNO <sub>3</sub> .....none								
HCl.....0.0003%								
As.....none								
CaO.....none								
ACID, Phosphoric, ortho, sp. gr. 1.7	Merck Blue Label			.70	incl	¼ lb.	.30	incl
Volatile acids.....less than 0.00125% as HNO <sub>3</sub>								
Nitric Acid.....less than 0.0045% as N <sub>2</sub> O <sub>5</sub>								
Hydrogen halogen acids.....less than 0.0003% as Cl								
Phosphorous Acid.....less than 0.03% as P <sub>2</sub> O <sub>5</sub>								
Sulphuric Acid.....less than 0.0025% as SO <sub>2</sub>								
Metaphosphoric Acid.....none								
Heavy metals.....none								
Earths, etc.....less than 0.01% as Ca								
Substances oxidizable by Permanganate.....none								
Arsenic.....less than 0.0002%								
ACID, Phosphoric, c. p., 50%				.35	gb .15			
“ Phosphoric, ortho, sp. gr. 1.12	Merck Blue Label			.45	incl	¼ lb.	.20	incl
The same impurities as sp. gr. 1.7								
“ Phosphoric, ortho, sp. gr. 1.057	Merck Blue Label			.60	incl	¼ lb.	.25	incl
The same impurities as sp. gr. 1.7								
“ Phosphoric, c. p., meta		.15	incl	1.00	gb .15	¼ lb.	.45	incl
“ Phosphoric, meta, stick (contains Sodium Phosphate)		.15	incl	.70	cb .08	¼ lb.	.30	incl



		Ounce and pound prices				Price in other size packages									
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.							
ACID, Phosphoric, meta.....		Merck Blue Label		.85	incl	¼ lb.	.30	incl							
Nitric Acid.....less than 0.016% as N <sub>2</sub> O <sub>5</sub>		Guaranteed Analysis													
Sulphates.....less than 0.039% as SO <sub>3</sub>															
Hydrogen halogen acids.....less than 0.0005% as Cl															
Heavy Metals.....none															
L. acid.....less than 0.02% as Ca															
Arsenic.....less than 0.0015%		Guaranteed Analysis													
Oxidizable substances.....none															
*ACID, Phosphoric Anhydride.....	Merck Blue Label								.25	incl	1.25	gb	1½ lb.	.45	incl
* " Phosphoric Anhydride.....	Merck Blue Label								.20	incl			1½ lb.	.80	incl
Arsenious Acid.....less than 0.01%															
Phosphotungstic, 10% solution.....				1.00	cb										
Phosphotungstic, crystals.....		.35	gb	.07											
Phosphotungstic.....		.45	incl			¼ lb.	1.35	incl							
Nitrates.....less than 0.0032% as N <sub>2</sub> O <sub>5</sub>		Guaranteed Analysis													
Ammonium salts.....less than 0.0045% as NH <sub>3</sub>															
ACID, Phthalic, c. p., anhydrous.....	Baker Analyzed								.25		2.50	cb	¼ lb.	.75	incl
" Picric, c. p., crystals. Dry Picric															
Acid is classed as a high explosive and can only be shipped subject to the regulations governing the transportation of goods of this class. If 20% water is added Picric Acid can be shipped with other chemicals.....									.20	incl	1.25	cb	¼ lb.	.35	incl
ACID, Pyrogalllic, resublimed.....		.17	incl	1.75	incl	¼ lb.	.50	incl							
Pyrogalllic.....		Merck Blue Label		.35	incl										
Inorganic matter.....less than 0.03%		Guaranteed Analysis													
Gallic Acid.....less than 1%															
ACID, Pyroligneous, technical.....				.10	cb	.09									
" Rosolic.....		.25	incl												
" Rosolic.....	Merck Blue Label	.40	incl												
Tested for.....Sensitiveness		Guaranteed Analysis													
Salicylic, pure.....									.40	cb	.09				
Salicylic, from Wintergreen Oil.....									.22	incl	3.00	cb	.09		
Silicic, coml., powder.....											.12	cc	.04		
Silicic, c. p.....									Baker Analyzed	.10	incl	.80	cb	¼ lb.	.30
" Silicotungstic.....	Merck Blue Label	1.50	incl												
Sulphates.....none		Guaranteed Analysis													
Chlorides.....less than 0.0025% as Cl															
Tungstate.....none															
Mercury and other heavy metals.....none															
Residue on ignition.....85-93%															
ACID, Stearic, U. S. P., powder.....				.35	cb	.10									
" Succinic, c. p.....		.60	incl												
" Succinic.....	Merck Blue Label	.80	incl			¼ oz.	.25	incl							
Nonvolatile matter.....less than 0.05%		Guaranteed Analysis													
Oxalic Acid.....less than 0.07%															
Tartaric Acid.....less than 2%															
Sulphates.....less than 0.001% as SO <sub>3</sub>															
Chlorides.....less than 0.002% as Cl															
Ammonium salts.....less than 0.0033% as NH <sub>3</sub>															
Heavy metals.....none															
ACID, Sulphanilic, crystals.....		.20	incl	1.50	cb	.09	¼ lb.	.55	incl						
" Sulphanilic.....	Merck Blue Label	.25	incl												
Inorganic matter.....less than 0.05%		Guaranteed Analysis													
Sulphuric Acid (Aniline Sulphate).....less than 0.004% as SO <sub>3</sub>															
Hydrochloric Acid (Aniline Hydrochloride).....less than 0.002% as Cl															
*ACID, Sulphuric, coml., in 9 lb. bottle.....				.06		9 lb.	.54	gb	.25						
* " Sulphuric, coml., in case of 10 glass stoppered bottles.....				.03½		90 lb.	3.15	3.30							
" Sulphuric, coml., in carboy.....				.02½		187 lb.	4.68	2.00							
" Sulphuric, c. p., sp. gr. 1.835-1.84.....	Baker Analyzed			.14	gb	.15									
" Sulphuric, c. p., in 9 lb. bottle.....	Baker Analyzed			.09		9 lb.	.81	gb	.25						
" Sulphuric, c. p., in case of 10 glass stoppered bottles.....	Baker Analyzed			.08		90 lb.	7.20	3.30							
" Sulphuric, c. p., in carboy.....	Baker Analyzed			.07		187 lb.	13.09	2.00							
Sp. gr. 1.835-1.84.....95.6-96.4%		Typical Analysis													
H <sub>2</sub> SO <sub>4</sub> .....none															
HCl.....none															
As.....none															
Fe.....— .0001%															
Nonvolatile matter......0002%															
NH <sub>3</sub> .....trace															
Sb.....none															

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
°ACID, Sulphuric, sp. gr. 1.84.....	Merck Blue Label			.40	incl	9 lb.	2.70	incl
Nonvolatile matter.....								
Nitric Acid.....								
Selenium.....								
Substances oxidizable by Permanganate (Nitrous and Sulphurous Acids).....								
Hydrogen halogen acids.....								
Lead.....								
Heavy metals.....								
Calcium.....								
Ammonium salts.....								
Arsenic.....								
°ACID, Sulphuric, diluted, 16%.....	Merck Blue Label			.40	incl	9 lb.	2.70	incl
° " Sulphuric, diluted, 10%.....	Merck Blue Label			.40	incl	9 lb.	2.70	incl
*ACID, Sulphuric, c. p. (Free from Nitrogen Compounds).....	Baker Special					9 lb.	1.08	gb .25
* " Sulphuric, coml., fuming, 20% SO <sub>3</sub> .....				.12		9 lb.	1.08	gb .25
* " Sulphuric, c. p., fuming, 15% SO <sub>3</sub> .....				.25	gb .15			
* " Sulphuric, fuming.....	Merck Blue Label			.45	incl			
* " Nitrogen.....								
* " Sulphuric, fuming, free from Nitrogen.....	Merck Blue Label			.75	incl			
Nonvolatile matter.....								
Nitric Acid.....								
Ammonium salts.....								
Halogens.....								
Lead.....								
Arsenic.....								
°ACID, Sulphuric, with P <sub>2</sub> O <sub>5</sub> .....	Merck Blue Label			.60	incl			
Nitric Acid.....								
Ammonium salts.....								
*ACID, Sulphuric, fuming, with P <sub>2</sub> O <sub>5</sub> .....	Merck Blue Label			.20	incl	¼ lb.	.75	incl
Nitrogen.....								
° " Sulphuric Anhydride, tested reagent.....	Merck Blue Label					1 Kilo	1.25	incl
° " Sulphuric Anhydride, tested reagent.....	Merck Blue Label					.50 gm	.63	incl
° " Sulphurous, c. p., 6% SO <sub>2</sub> .....	Baker Analyzed			.20	gb .15	5 lb.	.60	gb .25
SO <sub>2</sub> .....								
SiO <sub>2</sub> .....								
Fe.....								
Nonvolatile matter.....								
°ACID, Sulphurous, 6%.....	Merck Blue Label			.45	incl			
Nonvolatile matter.....								
" Sulphurous, cubes, 20%, tested reagent.....	Merck Blue Label			.60	incl	¼ lb.	.25	incl
" Tannic, pure.....				1.10	cc .08			
" Tannic, c. p.....				1.50	incl			
" Tannic.....	Merck Blue Label			.20	incl	½ lb.	.80	incl
Inorganic matter.....								
Zinc.....								
Sugar and Dextrin.....								
Water.....								
ACID, Tartaric, cryst.....				.45	cc .05			
" Tartaric, powdered.....				.45	cc .05			
" Tartaric, c. p., crystals.....	Baker Analyzed			.10	incl	¼ lb.	.30	incl
" Tartaric, c. p., powder.....	Baker Analyzed			.10	incl	¼ lb.	.30	incl
Nonvolatile matter.....								
SO <sub>2</sub> .....								
Oxalic Acid.....								
CaO.....								
Fe.....								
Pb.....								
ACID, Tartaric.....	Merck Blue Label			.90	incl	¼ lb.	.30	incl
Sulphuric Acid.....								
Oxalic Acid.....								
Calcium.....								
Lead and other metals.....								
Inorganic matter.....								
ACID, Thioacetic.....	Merck Blue Label			.30	incl	¼ lb.	.90	incl
Nonvolatile matter.....								
Sulphuric Acid.....								
ACID, Titanic, c. p., anhydrous (Titanium Oxide).....				.80	incl			
" Trichloroacetic, pure, crystals.....				.18	gb .07	2.00	gb .14	
" Tungstic.....				.25	cb .03			
" Tungstic, c. p.....				.45	incl			
" Uric, c. p.....				.75	cb .03			
" Valerianic (Valerie).....				.20	gb .07	1.75	gb .15	
ADONITE.....						1 grm.	1.50	incl

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
AGAR AGAR, in shreds, prime, white. This is a specially selected grade for preparation of culture media.....	A. H. T. Co. No. 40	.....	.....	.....	incl	.....	.....	.....
" powder.....	Witte	.25 cb	.03	2.00 cb	.08	.....	.....	.....
ALBUMEN, from blood.....	.....	.....	.....	.45	incl	.....	.....	.....
" from eggs, soluble scales.....	.....	.....	.....	1.15 cb	.09	.....	.....	.....
" from eggs, impalpable powder.....	.....	.....	.....	1.25 cb	.09	.....	.....	.....
°ALCOHOL, Amylic.....	.....	.....	.....	.60 cb	.09	.....	.....	.....
° " Amylic, purified.....	.....	.....	.....	.75 cb	.09	.....	.....	.....
° " Amylic, c.p.....	Baker Analyzed	.....	.....	1.25 cb	.08	1/4 lb.	.40	incl
Sp. gr.....	.814	Typical						
B. P.....	128°-130°C	Analysis						
°ALCOHOL, Amylic, for Gerbers fat determination, tested reagent.....	Merck Blue Label	.....	.....	1.25	incl	1/4 lb.	.40	incl
° " Amylic.....	Merck Blue Label	.....	.....	1.60	incl	1/4 lb.	.50	incl
Nonvolatile matter.....	less than 0.005%	Guaranteed						
Foreign organic matter (Furfural, etc.).....	none	Analysis						
°ALCOHOL, Butylic, iso, b. p. 106° C.....	.....	.....	.....	1.15 cb	.09	.....	.....	.....
° " Ethylic, denatured.....	.....	.....	.....	.....	.....	1 pt.	.15 cb	.09
° " Ethylic, denatured.....	.....	.....	.....	.....	.....	1 qt.	.25 cb	.12
° " Ethylic, denatured.....	.....	.....	.....	.....	.....	1/2 gal.	.40 cn	.18
° " Ethylic, denatured.....	.....	.....	.....	.....	.....	1 gal.	.75 cn	.25
° " Ethylic, denatured.....	.....	.....	.....	.....	.....	5 gal.	3.50 cn	.50
° " Ethylic, 90%.....	Merck Blue Label	.....	.....	1.10	incl	1/4 lb.	.35	incl
Residue.....	none	Guaranteed						
Fusel Oil.....	none							
Molasses-Alcohol.....	none							
Aldehyde.....	none							
Organic impurities.....	none							
Metals and Tannin.....	none							
Acetone.....	less than 0.02%							
Furfural.....	less than 0.001%							
°ALCOHOL, Ethylic, 95% (grain).....	.....	.....	.....	.....	.....	1 pt.	.50 cb	.09
° " Ethylic, 95% (grain).....	.....	.....	.....	.....	.....	1 qt.	1.00 cb	.12
° " Ethylic, 95% (grain).....	.....	.....	.....	.....	.....	1/2 gal.	1.75 cn	.18
° " Ethylic, 95% (grain).....	.....	.....	.....	.....	.....	1 gal.	3.25 cn	.25
° " Ethylic, 95% (grain).....	.....	.....	.....	.....	.....	4 3/4 gal.	15.35 cn	.50
° " Ethylic, 95% (grain).....	Baker Analyzed	.....	.....	.55 cb	.08	1 gal.	3.25 cb	.25
Sp. gr.....	.816	Typical						
B. P.....	78°C	Analysis						
Nonvolatile matter.....	0.005%							
°ALCOHOL, Ethylic, 90% (grain).....	Merck Blue Label	.....	.....	1.35	incl	1/4 lb.	.45	incl
Residue.....	none	Guaranteed						
Fusel Oil.....	none							
Molasses-Alcohol.....	none							
Aldehyde.....	none							
Organic impurities.....	none							
Metals and Tannin.....	none							
Acetone.....	less than 0.02%							
Furfural.....	less than 0.001%							
°ALCOHOL, Ethylic, absolute, 99.8%.....	.....	.....	.....	.....	.....	1 pt.	.70 cb	.09
° " Ethylic, absolute, 99.8%.....	.....	.....	.....	.....	.....	1 qt.	1.40 cb	.12
° " Ethylic, absolute, 99.8%.....	.....	.....	.....	.....	.....	1/2 gal.	2.50 cb	.18
° " Ethylic, absolute, 99.8%.....	.....	.....	.....	.....	.....	1 gal.	4.40 cb	.25
° " Ethylic, absolute, 99.75%.....	Baker Analyzed	.....	.....	.75 cb	.08	1 gal.	4.50 cb	.25
° " Ethylic, absolute.....	Baker Special	.....	.....	.85 cb	.08	.....	.....	.....
Aldehyde, (H <sub>2</sub> SO <sub>4</sub> test one-half hour) none	Merck Blue Label	.....	.....	1.60	incl	1/4 lb.	.50	incl
Residue.....	none	Guaranteed						
Fusel Oil.....	none							
Molasses-Alcohol.....	none							
Aldehyde.....	none							
Organic impurities.....	none							
Metals and Tannin.....	none							
Acetone.....	less than 0.02%							
Furfural.....	less than 0.001%							
°ALCOHOL, Ethylic, absolute, 99.8%.....	Kahlbaum	.....	.....	.....	.....	500 grm.	1.50	incl
° " Ethylic, absolute, 99.8%.....	Kahlbaum	.....	.....	.....	.....	1000 grm.	2.75	incl
° " Ethylic, absolute, 98%.....	Squibb	.....	.....	.....	.....	500 grm.	1.35	incl
°ALCOHOL, Methylic (wood).....	.....	.....	.....	.....	.....	1 pt.	.15 cb	.09
° " Methylic (wood).....	.....	.....	.....	.....	.....	1 qt.	.25 cb	.12
° " Methylic (wood).....	.....	.....	.....	.....	.....	1/2 gal.	.40 cn	.18
° " Methylic (wood).....	.....	.....	.....	.....	.....	1 gal.	.75 cn	.25
° " Methylic (wood).....	.....	.....	.....	.....	.....	5 gal.	3.50 cn	.50
° " Methylic, 95%.....	Baker Analyzed	.....	.....	.25 cb	.08	1 gal.	.95 cb	.25
° " Methylic, absolute.....	Baker Analyzed	.....	.....	.50 cb	.08	1 gal.	2.75 cb	.25
Sp. gr.....	.796	Typical						
Methyl Alcohol.....	99%	Analysis						
Nonvolatile matter.....	none							
Acetone.....	none							
Ethyl Alcohol.....	none							

	Maker or Brand	Ounce and pound prices			Price in other size packages		
		per oz.	cont.	size pkg.	per pkg.	cont.	
°ALCOHOL, Methylic, 97-98.7% (Columbian Spirits).....				1 gal.	1.25	cb	.25
° " Methylic, same as above.....				1 pt.	.20	cb	.69
° " Methylic, as specially recommended for use in preparation of Wright's, Hastings' and Romanowsky's blood stains.....	Merck "H. P."		.75	cb	.00		
°ALCOHOL, Methylic, Acetone free.....	Kahlbaum			500 grm.	1.25	cb	.12
° " Methylic, Acetone free.....	Kahlbaum			100 grm.	.40	cb	.05
° " Methylic.....	Merck Blue Label		.80	incl	1 1/4 lb.	.30	incl
Nonvolatile matter... less than 0.002%							
Acetone... less than 0.013%							
Ethyl Alcohol... less than 1%							
Empyreumatic substances..... none	Guaranteed Analysis						
Aldehydes..... none							
Substances oxidizable by Permanganate..... none							
Chloroform..... less than 0.01%							
°ALCOHOL, Propylic, pure.....		.30	cb	.01	2.50	cb	.10
°ALDEHYDE, pure, 50%.....					.80	cb	.00
° " pure, concentrated.....					1.15	cb	.00
ALIZARINE, paste, 20% (Sodium Monosulphonate) as recommended for use in gastric analysis.....		.10	cb	.03			
ALLOIN, as used for "occult" test for blood in faeces.....		.55	cb	.04			
ALPHANAPHTHOL.....	Merck Blue Label	.25	incl		1.00	cb	.00
Organic Substances insoluble in Sodium Hydroxide solution..... none	Guaranteed Analysis						
Organic Acids..... none							
Inorganic matter... less than 0.03%							
ALPHANAPHTHYLAMINE.....	Merck Blue Label	.60	incl		1 1/4 oz.	.25	incl
Tested for..... solubility	Guaranteed Analysis						
Nonvolatile matter... less than 0.03%							
ALUMINUM, metal, foil.....		.25	incl				
" metal, sheet.....				.90	incl		
" metal, mossy.....				1.20	incl		
" metal, powder, fine.....		.15	cb	.03	1.50	incl	
" metal, powdered.....				1.25	incl		
" wire, No. 24 B & S.....		.15	incl	.75	incl		
ALUMINUM, Acetate, c. p.....	Baker Analyzed	.12	incl	.90	cb	.00	1 1/4 lb. .30 incl
" Ammonium Sulphate (Ammonium Alum) coml., cryst.....				.10	cc	.05	
" Ammonium Sulphate, coml., powder.....				.15	cc	.05	
" Ammonium Sulphate, c. p., crystals.....	Baker Analyzed			.25	cb	.08	1 1/4 lb. .15 incl
" Ammonium Sulphate, c. p., powder.....	Baker Analyzed			.27	cb	.08	1 1/4 lb. .15 incl
" Chloride, c. p., crystals.....	Baker Analyzed	.12	incl	.80	cb	.08	1 1/4 lb. .25 incl
Fe..... .004%	Typical Analysis						
SO <sub>2</sub> ..... .002%							
ALUMINUM Chloride, c. p., sublimed.....		.20	incl	1.50	cb	.08	1 1/4 lb. .50 incl
" Fluoride, c. p.....				1.50	cb	.08	1 1/4 lb. .50 incl
" Hydroxide, pure.....				.60	cb	.00	
" Hydroxide, c. p.....	Baker Analyzed			1.50	cb	.08	1 1/4 lb. .60 incl
" Nitrate, c. p., crystals.....	Baker Analyzed	.10	incl	.75	cb	.08	1 1/4 lb. .25 incl
" Oxalate, c. p.....	Baker Analyzed			1.20	cb	.00	1 1/4 lb. .40 incl
" Oxide, pure.....				1.00	cb	.00	
" Oxide, c. p. (ignited).....	Baker Analyzed			1.00	cb	.00	1 1/4 lb. .35 incl
Fe..... .003%	Typical Analysis						
Cl..... .0001%							
SO <sub>2</sub> ..... .001%							
CaO..... none							
ALUMINUM Oxide, for Tannin determination by Wislicenus' method.....	Merck Blue Label	.80	incl		1 1/4 oz.	.25	incl
Metallic Mercury and Aluminum..... none	Guaranteed Analysis						
Tested for absorptive power for Tannin and colors.....							
ALUMINUM Phosphate, c. p.....	Baker Analyzed			1.50	cb	.12	1 1/4 lb. .50 incl
" Potassium Sulphate (Potassium Alum), crystals.....				.10	cc	.05	
" Potassium Sulphate, purified, powder.....				.10	cc	.05	



## A R T H U R H. T H O M A S C O M P A N Y

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
ALUMINUM	Potassium Sulphate, c. p., crystals.....	Baker Analyzed	.....		.25 cb	.08	¼ lb.	.15	incl
"	Potassium Sulphate, c. p., powdered.....	Baker Analyzed	.....		.30 cb	.08	¼ lb.	.15	incl
	Ca.....	Typical Analysis							
	Mg.....								
ALUMINUM	Sodium Sulphate, c. p. (Sodium Alum).....	Baker Analyzed	.....		.60 cb	.08			
"	Sulphate, coml.....		.....		.10 cc	.05			
"	Sulphate, pure.....		.....		.20 cb	.08			
"	Sulphate, c. p., crystals.....	Baker Analyzed	.....		.30 cb	.08			
"	Tartrate, c. p.....	Baker Analyzed	.....		1.90 cb	.08	¼ lb.	.60	incl
ALUNDUM,	RR, 60, 90 or 120 mesh.....	Baker Analyzed	.....		.50	incl	½ lb.	.30	incl
"	RR, 60, 90 or 120 mesh.....		.....				2 lb.	1.00	incl
"	RR, 60, 90 or 120 mesh (Specially treated and free from surface alkali).....		.....		.75	incl	½ lb.	.40	incl
"	RR, 60, 90 or 120 mesh (Specially treated and free from surface alkali).....		.....				2 lb.	1.50	incl
AMMONIA,	gas, in valve top steel cylinders, returnable for credit if in good condition.....		.....				10 lb.	10.00	15.00
AMMONIUM	Acetate, c. p.....	Baker Analyzed	.15	incl	.75 cb	.09	¼ lb.	.25	incl
	Nonvolatile matter..... 0.01%	Typical Analysis							
	Cl..... 0.03%								
AMMONIUM	Acetate.....	Merck Blue Label	.....		.80	incl	¼ lb.	.30	incl
	Nonvolatile matter..... less than 0.0167%	Guaranteed Analysis							
	Chlorides..... less than 0.0003% as Cl								
	Sulphates..... less than 0.0075% as SO <sub>3</sub>								
	Heavy metals..... none								
	Earths..... less than 0.004% as Ca								
AMMONIUM	Arsenate, c. p.....	Baker Analyzed	.15	incl	1.35 cb	.07	¼ lb.	.45	incl
"	Arsenite, c. p.....	Baker Analyzed	.15	incl	1.20 cb	.08	¼ lb.	.40	incl
"	Benzoate, c. p.....		.....		1.00 cb	.09			
"	Bicarbonate, c. p.....	Baker Analyzed	.....		.60 cb	.08	¼ lb.	.20	incl
"	Bichromate.....		.....		.45 cc	.05			
"	Bichromate, c. p.....	Baker Analyzed	.....		.75 cb	.07	¼ lb.	.30	incl
"	Bifluoride, c. p.....	Baker Analyzed	.....		1.50 cb	.09			
"	Binoxalate, c. p.....	Baker Analyzed	.....		.70 cb	.08	¼ lb.	.25	incl
"	Bisulphate, c. p.....	Baker Analyzed	.....		.50 cb	.08			
"	Bisulphite, c. p., conc. sol.....	Baker Analyzed	.....		.85 gb	.15	¼ lb.	.35	incl
	Sp. gr..... 1.32	Typical Analysis							
	Nonvolatile matter..... 0.03%								
	Cl..... 0.01%								
	SO <sub>3</sub> ..... 5.00%								
	SO <sub>2</sub> ..... 1%								
AMMONIUM	Bitartrate.....		.....		.75 cc	.05			
"	Bitartrate, c. p.....	Baker Analyzed	.....		1.50 cb	.08			
"	Borate, c. p.....	Baker Analyzed	.....		1.15 cb	.08			
"	Bromide, c. p.....	Baker Analyzed	.....		1.00 cb	.08	¼ lb.	.35	incl
"	Carbonate, lump.....		.....		.20 cc	.05	5 lb.	.90	incl
"	Carbonate, c. p.....	Baker Analyzed	.10	incl	.30 cb	.09	¼ lb.	.15	incl
	Nonvolatile matter..... none	Typical Analysis							
	Fe..... none								
	Cl..... 0.001%								
	SO <sub>3</sub> ..... none								
	Organic matter..... trace								
	Thiocyanate..... trace								
AMMONIUM	Carbonate.....	Merck Blue Label	.....		.55	incl	¼ lb.	.25	incl
	Nonvolatile matter..... less than 0.01%	Guaranteed Analysis							
	Calcium..... less than 0.0125%								
	Sulphate..... less than 0.01% as SO <sub>3</sub>								
	Chlorides..... less than 0.00025% as Cl								
	Thiosulphates..... less than 0.0008% as (NH <sub>4</sub> ) <sub>2</sub> S <sub>2</sub> O <sub>3</sub>								
	Phosphates..... less than 0.01% as P <sub>2</sub> O <sub>5</sub>								
	Heavy metals..... none								
	Sulphocyanates, less than 0.12% as SCN								
	Tar bases..... none								
AMMONIUM	Carbonate.....	Kahlbaum "C.f.A."	.....				100 grm.	.50	incl
"	Carbonate.....	Kahlbaum "C.f.A."	.....				500 grm.	.95	incl
	Nonvolatile matter..... none	Certified Analysis							
	Cl..... none								
	Sulphate..... none								
	Thiosulphate..... none								
	Heavy metals..... none								
	Tarry matter..... none								
AMMONIUM	Chloride, granular, pure.....		.....		.17 cc	.05			

		Ounce and pound prices				Price in other size packages			
		per oz.		per lb.		size pkg.		per pkg.	
		cont.		cont.		cont.		cont.	
		incl		incl		incl		incl	
AMMONIUM	Chloride, c. p. ....	Baker Analyzed		.10		.30 cb		.10	
	Nonvolatile matter.....	.001%				1/4 lb.		.15	
	SO <sub>2</sub> .....	none							
	Fe.....	.0003%							
	Aniline derivatives.....	trace							
AMMONIUM	Chloride.....	Merck Blue Label		.65		incl		1/4 lb.	
	Nonvolatile matter.....	less than 0.01%							
	Phosphates.....	less than 0.001% as P <sub>2</sub> O <sub>5</sub>							
	Arsenates.....	less than 0.005% as As <sub>2</sub> O <sub>3</sub>							
	Heavy metals.....	none							
	Calcium.....	less than 0.01%							
	Sulphates.....	less than 0.005% as SO <sub>3</sub>							
	Sulphocyanates, less than 0.12% as SCN	none							
	Tar bases.....	none							
AMMONIUM	Chloride.....	Kahlbaum "C.f.A."				100 grm.		.60	
"	Chloride.....	Kahlbaum "C.f.A."				500 grm.		1.20	
	Nonvolatile matter.....	none							
	Sulphate.....	none							
	Sulphocyanate.....	none							
	Phosphate and Arsenic.....	none							
	Heavy metals.....	none							
	Alkaline earths.....	none							
	Tarry matter.....	none							
AMMONIUM	Chloride, c. p. ....	Baker Special		.40 cb		.10		1/4 lb.	
	Nonvolatile matter.....	.001%							
	Aniline derivatives.....	none							
AMMONIUM	Chromate, c. p. ....	Baker Analyzed		.25		incl		1.80 cb	
"	Chromate.....	Merck Blue Label						1/4 lb.	
	Alkalies.....	not more than 0.25%						1/2 lb.	
	Chlorides.....	less than 0.0025% as Cl						1.25	
	Sulphates.....	less than 0.02% as SO <sub>3</sub>							
	Aluminum.....	less than 0.1%							
	Calcium.....	less than 0.003%							
AMMONIUM	Chromium Sulphate, c. p. .	Baker Analyzed		2.00 cb		.08			
"	Citrate, c. p. ....	Baker Analyzed		1.50 cb		.09			
"	Citrate Solution.....	Merck Blue Label						1/2 liter	
	Contains, 27.93 grams Ammonia per liter.								
"	Dithiocarbonate Solution.....	Merck Blue Label						1/2 lb.	
	Nonvolatile matter.....	less than 0.005%							
	Ammonium Carbonate.....	less than 0.0045% as (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>							
AMMONIUM	Fluoride, c. p. ....	Baker Analyzed		.20		incl		2.00	
	Fe.....	.001%							
	SO <sub>2</sub> .....	.001%							
	Nonvolatile matter.....	.005%							
AMMONIUM	Fluoride.....	Merck Blue Label		.25		incl		1/4 lb.	
	Nonvolatile matter.....	less than 0.005%							
	Chlorides.....	less than 0.001% as Cl							
	Sulphates.....	less than 0.3% as SO <sub>3</sub>							
	Silicofluorides.....	less than 0.015% (NH <sub>4</sub> ) <sub>2</sub> SiF <sub>6</sub>							
	Heavy metals.....	none							
AMMONIUM	Fluoride.....	Kahlbaum "C.f.A."				100 grm.		1.15	
	Nonvolatile matter, unweighable	none							
	Sulphate.....	none							
	Silicofluoride.....	none							
	Chloride.....	none							
	Heavy metals.....	none							
AMMONIUM	Formate, c. p. ....	Baker Analyzed		1.75 cb		.09			
"	Hydroxide, 20° (17.5% Ammonia), in 4 lb. bottle							4 lb.	
								.40 gb	
"	Hydroxide, 20° in case of 10 glass stoppered bottles.....							40 lb.	
								3.60	
"	Hydroxide, 20° in carboy.....							85 lb.	
								6.80	
"	Hydroxide, c. p., sp. gr. 0.90	Baker Analyzed		.13 gb		.15			
"	Hydroxide, c. p., in 4 lb. bot.	Baker Analyzed		.12				4 lb.	
								.48 gb	
"	Hydroxide, c. p., in case of 10 glass stoppered bottles.....	Baker Analyzed						40 lb.	
								4.40	
"	Hydroxide, c. p., in carboy.....	Baker Analyzed						94 lb.	
								9.40	
	Sp. gr.....	.90							
	NH <sub>3</sub> .....	28-29%							
	CO <sub>2</sub> .....	trace							
	Pyridine.....	trace							
	Nonvolatile matter.....	0.0004%							
*AMMONIUM	Hydroxide, c. p., free from Pyridine.....	Baker Special		.18				4 lb.	
"	Hydroxide, 10% and 20%... The same impurities as the 28%	Merck Blue Label		.35		incl		4 lb.	
								1.00	

# A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages				
		Maker or Brand		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
								4 lb.	1.20	incl
AMMONIUM	Hydroxide, 28%.....	Merck Blue Label				.40	incl			
	Nonvolatile matter.....									
	Chlorides.....									
	Pyridine.....									
	Tar bases (Aniline, Pyridine, Pyrrol, etc.).....									
	Heavy metals.....									
	Sulphates.....									
	Carbon Dioxide.....									
	Sulphides.....									
	Calcium.....									
	Magnesium.....									
	Phosphates.....									
	Substances oxidizable by Potassium Permanganate.....									
AMMONIUM	Hydrosulphide, (See Sulphide).....									
"	Iodide, c. p.....			.50	incl	4.50	cb .08	¼ lb.	1.50	incl
"	Molybdate, c. p., Nitric Acid solution.....					.25	gb .15	¼ lb.	1.75	incl
"	Molybdate, c. p., crystals.....	Baker Analyzed		.35	incl	5.00	cb .06	¼ lb.	1.75	incl
	MoO <sub>3</sub> .....			80.35%						
	P.....			none						
	As.....			none						
	Nitrate.....			none						
AMMONIUM	Molybdate.....	Merck Blue Label		.40	incl			¼ lb.	2.50	incl
	Phosphates.....									
	Heavy metals.....									
	Sulphates.....									
	Chlorides.....									
	Nitrates.....									
AMMONIUM	Nitrate, pure, crystals.....					.25	cc .05			
"	Nitrate, c. p.....	Baker Analyzed		.10	incl	.50	cb .09	¼ lb.	.20	incl
	Nonvolatile matter.....			.005%						
	Fe.....			.002%						
	Cl.....			.001%						
	SO <sub>3</sub> .....			none						
	I.....			none						
	CaO.....			trace						
AMMONIUM	Nitrate.....	Merck Blue Label		.70	incl			¼ lb.	.25	incl
	Nonvolatile matter.....									
	Phosphates.....									
	Arsenates.....									
	Heavy metals.....									
	Calcium.....									
	Sulphates.....									
	Sulphocyanates.....									
	Tar-bases.....									
	Chlorides.....									
	Nitrites.....									
AMMONIUM	Nitrate.....	Kahlbaum "C.f.A."						100 grm.	.60	incl
"	Nitrate.....	Kahlbaum "C.f.A."						500 grm.	1.10	incl
	Nonvolatile matter.....									
	Sulphate.....									
	Sulphocyanate.....									
	Chloride.....									
	Phosphate.....									
	Arsenate.....									
	Nitrite.....									
	Heavy metals.....									
AMMONIUM	Nitrite, liquid.....					.65	cb .08	¼ lb.	.35	incl
"	Oxalate, pure.....					.38	cc .05			
"	Oxalate, c. p.....	Baker Analyzed				.50	cb .08	¼ lb.	.20	incl
	Nonvolatile matter.....									
	I.....			.021%						
	Fe.....			.001%						
	Ca.....			.0005%						
	N.....			trace						
	Cl.....			.0002%						
	SO <sub>3</sub> .....			none						
AMMONIUM	Oxalate.....	Merck Blue Label		.80	incl			¼ lb.	.30	incl
	Nonvolatile matter.....									
	Sulphates.....									
	Chlorides.....									
	Heavy metals.....									
AMMONIUM	Oxalate.....	Kahlbaum "C.f.A."						100 grm.	.60	incl
"	Oxalate.....	Kahlbaum "C.f.A."						500 grm.	1.50	incl
	Nonvolatile matter.....									
	Chloride.....									
	Sulphate.....									
	Heavy metals.....									
	Content.....			99.83%						
AMMONIUM	Perchlorate.....	Kahlbaum "C.f.A."						10 grm.	.70	incl
"	Perchlorate.....	Kahlbaum "C.f.A."						50 grm.	2.00	incl
	Nonvolatile matter.....									
	Chloride.....									
	Sulphate.....									
	Barium.....									
	Heavy metals.....									

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
AMMONIUM	Persulphate, c. p.	Baker Analyzed			.85	cb .08			
	Nonvolatile matter.....						¼ lb.	.30	incl
	Fe.....								
	CaO.....								
	Cl.....								
	Mn.....								
AMMONIUM	Persulphate.....	Merck Blue Label			.80	incl	¼ lb.	.30	incl
	Nonvolatile matter, not more than 0.0667%.....								
	Chlorides..... less than 0.002% as Cl								
	Heavy metals..... none, or at most, a trace								
AMMONIUM	Persulphate.....	Kahlbaum					500 grm.	3.00	incl
"	Phosphate, 98% conl.....				.25	cc .05			
"	Phosphate, c. p., Dibasic								
	[(NH <sub>4</sub> ) <sub>2</sub> HPO <sub>4</sub> ].....	Baker Analyzed			.80	cb .08	¼ lb.	.30	incl
	Cl.....								
	SO <sub>4</sub> .....								
	As.....								
	Fe.....								
	CaO.....								
AMMONIUM	Phosphate, Dibasic								
	[(NH <sub>4</sub> ) <sub>2</sub> HPO <sub>4</sub> ].....	Merck Blue Label			1.25	incl	¼ lb.	.40	incl
	Alkalies..... not more than 0.15%.....								
	Arsenic..... less than 0.0015%.....								
	Carbonates..... less than 2% CO <sub>2</sub> .....								
	Sulphates..... less than 0.0075% as SO <sub>4</sub> .....								
	Chlorides..... less than 0.0015% as Cl								
	Nitrates..... less than 0.0016% as N <sub>2</sub> O <sub>5</sub> .....								
	Heavy metals..... none								
AMMONIUM	Phosphate.....	Kahlbaum "C.f.A."					100 grm.	.80	incl
"	Phosphate.....	Kahlbaum "C.f.A."					500 grm.	2.25	incl
	Nonvolatile matter..... trace								
	Carbonate..... none								
	Sulphate..... none								
	Chloride..... faint trace								
	Nitrate..... none								
	Arsenic..... none								
	Heavy metals..... none								
	Content..... 99.06%								
AMMONIUM	Phosphate, c. p., monobasic								
	(NH <sub>4</sub> H <sub>2</sub> PO <sub>4</sub> ).....	Baker Analyzed			.90	cb .08	¼ lb.	.35	incl
	As.....								
	HNO <sub>3</sub> .....								
	SO <sub>4</sub> .....								
	Cl.....								
	Fe.....								
AMMONIUM	Phospho-Molybdate, c. p.				1.00	incl			
"	Potassium Phosphate, c. p.	Baker Analyzed			.75	cb .08			
"	Potassium Tartrate, c. p.				1.50	cb .08			
"	Silicofluoride, c. p.				1.40	cb .08			
"	Sulphate, conl.				.10	cc .05			
"	Sulphate, pure				.20	cb .08			
"	Sulphate, c. p.	Baker Analyzed			.30	cb .08	¼ lb.	.15	incl
	Nonvolatile matter..... 0.001%								
	Cl..... 0.0002%								
	CaO.....								
	Fe..... 0.0002%								
AMMONIUM	Sulphate.....	Merck Blue Label			.65	incl	¼ lb.	.25	incl
	Nonvolatile matter..... less than 0.017%.....								
	Chlorides..... less than 0.00023% as Cl								
	Heavy metals..... none								
	Sulphocyanates..... less than 0.12% as SCN								
	Phosphates..... less than 0.001% as P <sub>2</sub> O <sub>5</sub> .....								
	Arsenic..... less than 0.005% as As <sub>2</sub> O <sub>3</sub> .....								
	Nitrates..... less than 0.0016% as N <sub>2</sub> O <sub>5</sub> .....								
AMMONIUM	Sulphate.....	Kahlbaum "C.f.A."					100 grm.	.55	incl
"	Sulphate.....	Kahlbaum "C.f.A."					500 grm.	1.15	incl
	Nonvolatile matter..... none								
	Chloride..... none								
	Nitrate..... none								
	Phosphate..... none								
	Arsenic..... none								
	Sulphocyanate..... none								
	Heavy metals..... none								
AMMONIUM	Sulphide, (Hydrosulphide)								
"	Sulphide Solution.....	Merck Blue Label			.30	gb .15	5 lb.	1.10	gb .25
	Arsenic..... less than 0.0006%.....				.60	incl	¼ lb.	.25	incl
	Antimony..... less than 0.0007%.....								
	Tin..... less than 0.0013%.....								
	Nonvolatile matter..... less than 0.005%.....								
	Ammonium Carbonate.....								
	Chloride..... less than 0.005% as CO <sub>2</sub> .....								
AMMONIUM	Sulphite, c. p., crystals.....	Baker Analyzed			1.00	cb .08	¼ lb.	.35	incl
"	Sulphocyanate, c. p.	Baker Analyzed			.65	cb .09	¼ lb.	.20	incl
	Nonvolatile matter..... 0.015%.....								
	Fe..... 0.0003%.....								
	Cl..... 0.0005%.....								
	Stb..... 0.001%.....								



		Dunce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
AMMONIUM	Sulphocyanate.....	Merck Blue Label		.20	incl			
	Nonvolatile matter, less than 0.025%					½ lb.	.75	incl
	Substances insoluble in Alcohol, none							
	Sulphates, less than 0.01% as SO <sub>3</sub>	Guaranteed Analysis						
	Heavy metals, none							
AMMONIUM	Sulphocyanate.....	Kahlbaum "C.f.A."				100 grm.	.80	incl
	" Sulphocyanate.....	Kahlbaum "C.f.A."				500 grm.	2.25	incl
	Nonvolatile matter, unweighable							
	Solubility in Alcohol, complete	in 10 Certified Analysis						
	Iron, none							
AMMONIUM	Sulphate.....							
	Heavy metals, none							
	Tartrate, c. p.....	Baker Analyzed		1.25	cb .08	¼ lb.	.40	incl
	Tetroxalate, c. p.....	Baker Analyzed		.75	cb .08			
	Thioacetate Solution.....	Merck Blue Label		.50	incl			
AMMONIUM	Nonvolatile matter, less than 0.005%							
	Ammonium Carbonate	Guaranteed Analysis						
	less than 0.003% as (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>							
	Sulphates, less than 0.0002% as SO <sub>3</sub>							
	Thiocyanate (See Sulphocyanate).							
AMMONIUM	Thiosulphate, c. p.....	Baker Analyzed		1.10	cb .08	¼ lb.	.35	incl
	Vanadate.....			.80	incl			
	Zinc Sulphate, c. p.....			.80	cb .08			
AMYGDALIN						10 grm.	.55	incl
AMYL	Acetate, 98% (so called absolute) ..			.70	cb .09			
	Acetate, (iso), as recommended for use in Photometry for Heffner's Standard Lamp.	Kahlbaum		2.75	gb .12			
	Acetate, tested, for use with Wanner Optical Pyrometer.....					Per bottle	2.10	incl
	Nitrite, pure.....			.25	cb .08			
	Nitrite, pure.....			.80	incl			
ANILINE, pure.....		Merck Blue Label				¼ lb.	.30	incl
ANILINE,	Hydrocarbons and Nitrobenzene, none							
	c. p., as specially recommended for use in microscopy.....			1.00	cb .08			
	Hydrochloride, c. p.....			1.00	cb .08			
	Sulphate, c. p.....			1.00	cb .10			
	"ANTIFORMIN," as used in staining sputum for B. tuberculosis.....			.50	incl	¼ lb.	.25	incl
ANTIMONY,	metal.....			.25	cc .04			
	metal, powder.....			.30	cc .04			
	metal, granular.....	Baker Analyzed		.50	cb .06	¼ lb.	.20	incl
	Typical Analysis							
	As.....							
ANTIMONY,	metal.....	Kahlbaum				100 grm.	1.10	incl
	Chloride, (Tri), c. p.....	Baker Analyzed		.15	incl	¼ lb.	.40	incl
	Chloride (Penta), c. p., fuming.....			1.40	gb .15	¼ lb.	.45	incl
	Oxide (Tri), c. p.....	Baker Analyzed		1.00	cb .06	¼ lb.	.35	incl
	Fe..... 0.001%							
ANTIMONY	Chloride (Penta), c. p.....							
	Insoluble residue..... trace							
	Oxide (Penta), c. p.....	Baker Analyzed		1.00	cb .06	¼ lb.	.35	incl
	Oxide (Tri).....	Merck Blue Label		.30	incl			
	Arsenic, less than 0.0015%	Guaranteed Analysis						
ANTIMONY	Foreign heavy metals, none							
	Chlorides, less than 0.09% as Cl							
	Oxychloride, c. p.....	Baker Analyzed		1.20	cb .06	¼ lb.	.40	incl
	Potassium Tartrate, purified, powder.....			.45	cc .05			
	Potassium Tartrate, c. p., powder.....	Baker Analyzed		.75	cb .07	¼ lb.	.25	incl
ANTIMONY	Typical Analysis							
	As.....							
	Sulphate, c. p.....	Baker Analyzed		.85	cb .08			
	Sulphide (Tri), c. p., red.....	Baker Analyzed		1.50	cb .09	¼ lb.	.50	incl
	Sulphide (Penta), c. p., yellow.....			1.00	cb .06			
ANTIMONY	Tartrate, c. p.....			1.00	cb .08			

	Maker or Brand	Ounce and pound prices			Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg. cont.
ARABINOSE.....						5 grm.	2.25 incl
ARGOLS (Potassium Bitartrate, crude).....				.10 cc	.04		
ARSENIC, metal, lump.....				.45 cc	.05		
" Chloride (Tri), pure liquid.....		.45	incl				
" Sulphide, yellow (Orpiment).....				.25 cc	.05		
" Sulphide, red.....				.25 cc	.05		
" Trioxide (Arsenious Acid), lump or powdered.....	Merck Blue Label			.40	incl	¼ lb.	.20 incl
Nonvolatile matter.....less than 0.05%							
Barium Sulphate, Talcum, Calcium Sulphate, etc.....none	Guaranteed Analysis						
Arsenic Sulphide.....less than 0.0005% as S							
ARSENIC Trisulphide, c. p.....				1.00 cb	.07		
ASBESTOS, wool, clean for filtering.....				.50	incl		
" Italian, short fibre.....				2.00	incl		
" Italian, short fibre, washed in acid.....				2.50	incl		
" Italian, short fibre, washed and ignited.....				2.75	incl		
" Special for Gooch crucibles. This is short fibre suitable for rapid filtering and contains a trace of iron.....		.25	incl	2.50	incl		
" Italian, long fibre.....				2.50	incl		
" Italian, long fibre, washed in acid.....				3.50	incl		
" extra long fibre, selected, white.....				3.50	incl		
" for Gooch crucibles.....	Kahlbaum	.75	incl				
" platimized 5%.....		4.50	incl				
ASPARAGIN.....		1.00	cb	.01			
ASPHALTUM.....		.10	cb	.03	.25 cb	.08	
AZOLITMIN.....						5 grm.	.50 incl
AZOLITMIN.....	Kahlbaum					5 grm.	.70 incl
".....	Kahlbaum					10 grm.	1.30 incl
".....	Kahlbaum					25 grm.	3.00 incl
AZOLITMIN.....	Merck Blue Label					½ oz.	1.75 incl
".....	Merck Blue Label					1 oz.	.50 incl
Tested for.....sensitiveness							
BALSAM, Canada (See Microscopic Mounting Media, Section II).							
BARIUM Acetate, c. p.....	Baker Analyzed			.80 cb	.08	¼ lb.	.30 incl
Na.....—trace	Typical Analysis						
Cl.....—0.003%							
CaO.....—0.001%							
SO <sub>3</sub> .....—0.001%							
Fe.....—0.0003%							
BARIUM Acetate.....	Merck Blue Label	.20	incl			½ lb.	.70 incl
Chlorides.....less than 0.002% as Cl	Guaranteed Analysis						
Calcium and alkalis. not more than 0.08%							
Heavy metals.....none							
Nitrates.....less than 0.0032% as N <sub>2</sub> O <sub>5</sub>							
BARIUM Acetate.....	Kahlbaum "C.f.A."					100 grm.	.80 incl
".....	Kahlbaum "C.f.A."					500 grm.	2.25 incl
Nonvolatile alkalis present after precipitating Barium...1.95 mg/precipitate.....none	Certified Analysis						
Nitrate.....—none							
Chloride.....—none							
Heavy metals.....—none							
BARIUM Borate.....	Baker Analyzed			.80 cb	.12		
" Carbonate, native, powdered (Witherite).....				.15 cc	.01		
" Carbonate, precipitated, pure, white.....				.30 cc	.05		
" Carbonate, c. p.....	Baker Analyzed			.60 cb	.07	¼ lb.	.22 incl
Fe.....—0.001%	Typical Analysis						
Cl.....—0.001%							
Na (flame test).....—trace							
CaO.....—0.005%							
BARIUM Carbonate.....	Merck Blue Label	.20	incl			½ lb.	.70 incl
Tested for solubility in Hydrochloric Acid.....	Guaranteed Analysis						
Barium Hydroxide.....not more than 0.223%							
Calcium and alkalis.....not more than 0.08%							
Heavy metals.....none							
Chlorides.....less than 0.015% as Cl							
Nitrates.....less than 0.0032% as N <sub>2</sub> O <sub>5</sub>							
BARIUM Carbonate, precipitated.....	Kahlbaum "C.f.A."					100 grm.	.75 incl

## A R T H U R H. T. H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages				
		Maker or Brand		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
BARIUM	Carbonate, precipitated.....	Kahlbaum	"C.f.A."					500 grm.	1.80	incl
	Heavy metals.....none									
	Insoluble in Hydrochloric Acid.....none									
	Nonvolatile residue present after precipitating Barium.....14 mg.	in 10 grams	Certified Analysis							
	Chloride.....trace									
	Nitrate.....none									
BARIUM	Chloride, crystals.....					.10 cc	.04			
"	Chloride, pure.....					.12 cc	.07			
"	Chloride, c. p.....	Baker Analyzed				.25 cb	.07	¼ lb.	.15	incl
	Fe.....0.0003%									
	CaO.....0.0007%									
	Sr.....none	in 10 grams	Typical Analysis							
	Na (flame test).....trace									
BARIUM	Chloride, c. p. special.....	Baker Analyzed				.40 cb	.07	¼ lb.	.15	incl
	Fe.....trace									
	CaO.....none									
BARIUM	Chloride.....	Merck Blue Label				.40	incl	¼ lb.	.20	incl
	Alkalies.....not more than 0.0333%									
	Strontium and Calcium Chlorides less than 0.025% as Cl									
	Heavy metals.....none	in 10 grams	Guaranteed Analysis							
	Nitrates.....less than 0.0032% as N <sub>2</sub> O <sub>5</sub>									
	Chlorates.....less than 0.025% as ClO <sub>3</sub>									
BARIUM	Chloride.....	Kahlbaum	"C.f.A."					100 grm.	.50	incl
"	Chloride.....	Kahlbaum	"C.f.A."					500 grm.	.90	incl
	Alkaline residue present after precipitating Barium.....1 mg.									
	Nitrate.....none	in 10 grams	Certified Analysis							
	Chlorate.....none									
	Strontium and Calcium Chloride faint trace									
BARIUM	Chloride, c. p., anhydrous.....					.50 cb	.07			
"	Chromate, c. p.....	Baker Analyzed				.80 cb	.07	¼ lb.	.35	incl
"	Dioxide (See Peroxide).....									
"	Fluoride, c. p.....	Baker Analyzed				.85 cb	.07			
"	Hydroxide, pure, crystals.....					.25 cb	.08			
"	Hydroxide, c. p., crystals.....	Baker Analyzed				.35 cb	.08	¼ lb.	.15	incl
	CaO.....0.0004%									
	Fe.....0.0004%									
	Cl.....0.0003%									
	CO <sub>2</sub> .....trace	in 10 grams	Typical Analysis							
	S.....none									
	Sr.....none									
BARIUM	Hydroxide.....	Merck Blue Label				.60	incl	¼ lb.	.25	incl
	Chlorides.....less than 0.0005% as Cl									
	Calcium and alkalies not more than 0.667%									
	Heavy metals.....none	in 10 grams	Guaranteed Analysis							
	Sulphides.....less than 0.0027% as S									
BARIUM	Hydroxide, c. p., anhydrous.....	Baker Analyzed				.60 cb	.06	¼ lb.	.22	incl
"	Hydroxide, Solution, 3.3%.....	Merck Blue Label				.50	incl			
	Chlorides.....less than 0.0005% as Cl									
	Calcium and alkalies not more than 0.667%									
	Heavy metals.....none	in 10 grams	Guaranteed Analysis							
	Sulphides.....less than 0.0027% as S									
BARIUM	Hydroxide, alkali free.....	Kahlbaum	"C.f.A."					100 grm.	.55	incl
"	Hydroxide, alkali free.....	Kahlbaum	"C.f.A."					500 grm.	1.00	incl
	Alkalies.....none									
	Lime.....none	in 10 grams	Certified Analysis							
	Chloride.....faint trace									
	Sulphide.....none									
	Heavy metals.....none									
	Content found.....100.5%									
BARIUM	Nitrate, powder.....					.15 cc	.04			
"	Nitrate, c. p.....	Baker Analyzed				.30 cb	.06	¼ lb.	.17	incl
	Cl.....0.001%									
	CaO.....0.001%									
	Fe.....0.001%									
	Na (flame test).....trace	in 10 grams	Typical Analysis							
	Sr.....none									
BARIUM	Nitrate.....	Merck Blue Label				.50	incl	¼ lb.	.20	incl
	Chlorides.....less than 0.0005% as Cl									
	Alkalies.....not more than 0.0097%									
	Heavy metals.....none	in 10 grams	Guaranteed Analysis							
BARIUM	Oxalate, c. p.....	Baker Analyzed				.90 cb	.09			
"	Oxide, c. p., hydrated.....	Baker Analyzed				.60 cb	.06			
"	Peroxide (Dioxide).....					.30 cc	.04			
"	Peroxide, c. p.....	Baker Analyzed				.60 cb	.06	¼ lb.	.22	incl
	Fe <sub>2</sub> O <sub>3</sub> .....89%									
	Fe.....0.050%									
	Al <sub>2</sub> O <sub>3</sub> .....0.020%	in 10 grams	Typical Analysis							
	CaO.....0.001%									
	SiO <sub>2</sub> .....trace									
BARIUM	Peroxide, tested reagent.....	Merck Blue Label				.65	incl	¼ lb.	.25	incl

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices			Price in other size packages		
		per oz.	cont.	per lb.	size pkg.	per pkg.	cont.
*BARIUM Peroxide, c. p., hydrated.....	Baker Analyzed			.70 cb .06			
Fe.....0.001%	Typical Analysis						
CaO.....0.001%							
Cl.....0.001%							
Na.....trace							
BARIUM Phosphate, c. p.....	Baker Analyzed			1.65 cb .08			
" Sulphate, coml.....				.13 cc .05			
" Sulphate, c. p., powdered.....	Baker Analyzed			.30 cb .07			
" Sulphide, pure.....	Baker Analyzed			.65 cb .07	¼ lb.	.20	incl
Cl.....0.010%	Typical Analysis						
CaO.....0.001%							
Fe.....0.0003%							
Free S.....present							
As.....trace							
BARIUM Sulphide.....	Merck Blue Label			.70 incl	¼ lb.	.25	incl
Arsenic.....less than 0.0001%							
BARIUM Sulphite, c. p.....				.75 cb .07			
" Tartrate, c. p.....	Baker Analyzed			2.00 cb .08			
" Thiosulphate, c. p. (for stand- ardizing).....	Baker Special			1.00 cb .08	¼ lb.	.35	incl
BEEF Extract, for preparation of culture media.....	Liebig's			2.75 incl	¼ lb.	.90	incl
BENZALDEHYDE (Essential Oil of Al- monds).....				.85 cb .09			
°BENZENE (Benzol) 50% water white.....					1 pt.	.10 cb .08	
° " (Benzol) 50% water white.....					1 gal.	.75 cn .25	
° " (Benzol) 50% water white.....					5 gal.	2.75 cn .50	
° " (Benzol) 90% water white.....					1 pt.	.15 cb .08	
° " (Benzol) 90% water white.....					1 gal.	.90 cn .25	
° " (Benzol) 90% water white.....					5 gal.	3.25 cn .50	
°BENZENE (Benzol) c. p., crystallizable, water white.....					1 pt.	.17 cb .08	
° " (Benzol) c. p., crystallizable, water white.....					1 gal.	1.00 cn .25	
° " (Benzol) c. p., crystallizable, water white.....					5 gal.	3.75 cn .50	
° " (Benzol), c. p.....	Baker Analyzed			.85 cb .08			
Sp. gr.....0.883	Typical Analysis						
B. P.....80.4°C							
M. P.....4°C							
Thiophene.....none							
°BENZENE (Benzol).....	Merck Blue Label			.55 incl			
Thiophene.....none	Guaranteed Analysis						
Carbon Disulphide.....less than 0.0072%	Merck Blue Label	1.00	incl		¼ oz.	.35	incl
BENZIDINE.....	Guaranteed Analysis						
Sulphates.....less than 0.0125% as SO <sub>4</sub>	Merck Blue Label	1.00	incl		¼ oz.	.35	incl
Nonvolatile matter.....less than 0.05%	Merck Blue Label	1.00	incl				
BENZIDINE, for Blood Test.....							
Tested for suitability for blood detection							
°BENZIN (Naphtha).....	Merck Blue Label			.15 cb .08	1 gal.	.40 cn .25	
°BENZIN (Petroleum Ether).....	Merck Blue Label			.50 incl			
Nonvolatile matter and heavy oils.....none	Guaranteed Analysis						
Aoids.....none							
Sulphur compounds and reducing agents.....none							
BENZYL Chloride.....				.20 gb .07			
BENZYL-CHLORIDE, pure.....				.65 gb .12			
BERLIN Blue (See Injecting Media).....							
°BERYLLIUM Nitrate, c. p., crystals		1.00	incl				
BISMUTH, metal.....				2.75 cc .04			
BISMUTH, metal.....	Baker Analyzed	.30	incl	3.00 incl	¼ lb.	1.00	incl
Pb.....none	Typical Analysis						
Fe.....0.0009%							
Cu.....none							
As.....none							
Sb.....none							
Su.....none							
BISMUTH, metal, c. p., sticks.....		.75	incl				
" Carbonate, c. p.....	Baker Analyzed	.45	incl	4.25 cb .09	¼ lb.	1.50	incl
" Chloride, c. p.....	Baker Analyzed	.45	incl	4.25 gb .12	¼ lb.	1.50	incl
Fe.....0.002%	Typical Analysis						
Pb.....0.001%							
SO <sub>4</sub> .....0.001%							
As.....trace							
BISMUTH Hydroxide, c. p.....	Baker Analyzed	.45	incl	4.25 cb .06	¼ lb.	1.50	incl
" Nitrate, c. p.....	Baker Analyzed	.30	incl	3.00 gb .12	¼ lb.	1.00	incl
" Oxide, c. p.....	Baker Analyzed			5.00 cb .04	¼ lb.	1.75	incl
" Oxychloride, c. p.....	Baker Analyzed			4.25 cb .06			
" Subgallate, pure.....				3.00 cb .08			
" Subnitrate, pure powder.....		.25	incl	2.25 incl			



		Ounce and pound prices				Price in other size packages			
		per oz.		per lb.		size pkg.		per pkg.	
		cont.		cont.		cont.		cont.	
		incl		incl		incl		incl	
BISMUTH	Subnitrate, c. p. ....	.40		incl 3.75 cb		.06		¼ lb. 1.25	
	Cl.....0.003%								
	SO <sub>3</sub> .....none								
	Pb.....none								
	As.....none								
BISMUTH	Subnitrate.....	.30		incl				½ lb. 1.75	
	Carbonates.....								
	Lead.....less than 0.165%								
	Copper.....less than 0.01%								
	Salts of the alkalis.....less than 0.25%								
	Chlorides.....less than 0.01% as Cl								
	Arsenates.....less than 0.003% as As								
	Sulphates.....less than 1.5% as SO <sub>3</sub>								
	Residue on ignition.....79-82%								
	Arsenic.....less than 0.001%								
BISMUTH	and Potassium Iodide Solution,	.30		incl				¼ lb. .90	
	tested reagent.....								
"	Tetraoxide, c. p., free from Mn.	.60		incl 6.00 cb		.07		¼ lb. 2.00	
BLEACHING Powder (Calcium Hypochlorite) (Oxychloride)								1 can .10	
Powder.....								10 lb. .60	
BONE ASH, best quality for cupels				10 cc .05					
BORAX (See Sodium Borate)									
BRAZILWOOD.....				.20		incl			
BROMINE, U. S. P.	U. S. P.....	.25		incl 1.00		incl		¼ lb. .35	
	U. S. P.....							½ lb. .60	
BROMINE, c. p.	U. S. P.....	.20		gb .15		.85 gb .20		¼ lb. .30 gb .15	
	U. S. P.....							½ lb. .50 gb .15	
BROMINE	Water, 3%.....	.30		incl				½ lb. 1.00	
	Nonvolatile matter.....less than 0.01%								
	Sulphuric Acid.....less than 0.005% as SO <sub>3</sub>								
	Organic Bromine compounds (Bromofarm and Carbon Tetrabromide).....none								
	Iodine.....less than 0.75%								
BROMINE	Water, 3%.....			.60		incl			
	Sulphuric Acid.....less than 0.0002% as SO <sub>3</sub>								
Tested for.....Bromine content									
BRUCINE.....								⅛ oz. .30	
Water of crystallization.....									
Nitric acid.....not more than 8.4%									
.....less than 0.05% N <sub>2</sub> O <sub>5</sub>									
CADMIUM	metal, powder.....			3.00		incl			
	metal, sheets.....			3.75		incl			
CADMIUM	metal, sticks, gran. and mossy			1.75		incl		¼ lb. .60	
	Acetate, c. p.....			2.50 cb		.07			
CADMIUM	Borotungstate Solution, sp. gr. 3.28, tested reagent.....	.80		incl				¼ oz. .30	
	Bromide, c. p.....			2.00 cb		.07		¼ lb. .65	
CADMIUM	Carbonate, c. p.....			2.50 cb		.07		¼ lb. .75	
	Chloride, c. p., crystals.....	.20		incl 1.85 cb		.07		¼ lb. .60	
CADMIUM	Zn.....none								
	SO <sub>3</sub> .....0.001%								
	Fe.....0.001%								
	As.....none								
	.....								
CADMIUM	Chloride, c. p., anhydrous.....			2.25 cb		.06		¼ lb. .60	
	Hydroxide, c. p.....			4.00 cb		.09		¼ lb. 1.25	
CADMIUM	Iodide, c. p.....			5.50 cb		.07		¼ lb. 1.60	
	Nitrate, c. p.....	.20		incl 1.85 cb		.07		¼ lb. .65	
CADMIUM	Oxide, c. p.....			4.00 cb		.07		¼ lb. 1.25	
	Potassium Iodide.....	.80		incl				¼ oz. .30	
CADMIUM	Foreign metals.....none								
	Sulphates.....less than 0.01% as SO <sub>3</sub>								
CADMIUM	Iodic Acid.....less than 0.0012% as HIO <sub>3</sub>								
	Sulphate, c. p.....			1.85 cb		.07		¼ lb. .65	
CADMIUM	Sulphide, c. p.....			2.75 cb		.08		¼ lb. .90	
CALCIUM,	electrolytic.....							100 grm. 1.00	
	Acetate, purified.....			.70 cb		.09			
CALCIUM	Acetate, c. p.....			.75 cb		.10		¼ lb. .25	
	Na (flame test).....								
CALCIUM	SO <sub>3</sub> .....0.010%								
	Cl.....0.001%								
CALCIUM	Fe.....0.001%								
	MgO.....0.001%								
CALCIUM	Arsenate, c. p.....			1.50 cb		.08		¼ lb. .45	
	Arsenite, c. p.....			1.50 cb		.08		¼ lb. .45	
CALCIUM	Bisulphite, c. p., solution.....			.35 cb		.08			
	Carbide, lump.....			.20		incl		10 lb. 1.75	
CALCIUM	Carbonate, precipitated.....			.10 cc		.05			
	Carbonate, lump (Marble).....			.10 cc		.04			
CALCIUM	Carbonate, pure.....			.40 cb		.08			

## A R T H U R H. T H O M A S C O M P A N Y

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
CALCIUM	Carbonate, c. p.	Baker Analyzed			.60	cb .08	1/4 lb.	.22	incl
	Fe.....								
	Na.....								
	Cl.....								
	MgO.....								
	Nitrate.....								
CALCIUM	Carbonate, precipitated.....	Merck Blue Label		1.00		incl	1/4 lb.	.35	incl
	Tested for.....								
	Solubility in Hydrochloric, Nitric and Acetic Acids.....								
	Heavy metals.....								
	Magnesium.....								
	Sulphates.....								
	Chlorides.....								
	Phosphates.....								
	Alkalies and Calcium Oxide.....								
	not more than 0.02%								
CALCIUM	Carbonate, precipitated.....	Kahlbaum "C.f.A."					100 grm.	.75	incl
"	Carbonate, precipitated.....	Kahlbaum "C.f.A."					500 grm.	1.60	incl
	Magnesium.....								
	Caustic Potash.....								
	Sulphate and phosphate.....								
	Chloride.....								
	Soluble alkali.....								
	Solubility in dilute Acetic Acid.....								
	complete								
	Heavy metals.....								
CALCIUM	Carbonate, c. p., for standardizing.....	Baker Special		1.00	cb .08		1/4 lb.	.35	incl
"	Carbonate, (Iceland Spar) for standardizing.....		.45	incl	4.50	incl	1/4 lb.	1.40	incl
"	Chloride, granular, purified.....				.20	cb .09			
"	Chloride, pure, lump or granular, anhydrous.....				.25	cb .10			
"	Chloride, c. p., anhydrous for drying tubes, 4, 8, and 12 mesh.....	Baker Analyzed			.50	cb .09			
	Fe.....								
	CaO.....								
	Free Cl.....								
	MgO.....								
	SO <sub>2</sub> .....								
CALCIUM	Chloride, dry, granulated.....	Merck Blue Label		.45		incl			
	Neutrality.....								
	less than 0.0028% as CaO								
	Arsenic.....								
	less than 0.0002%								
CALCIUM	Chloride, c. p., crystals.....	Baker Analyzed		.35	cb .08		1/4 lb.	.18	incl
	Ba.....								
	Fe.....								
	Sr.....								
	MgO.....								
	SO <sub>2</sub> .....								
CALCIUM	Chloride, crystals.....	Merck Blue Label		.45		incl			
	Substances insoluble in Absolute Alcohol.....								
	Heavy metals.....								
	Sulphates.....								
	less than 0.0038% as SO <sub>2</sub>								
	Ammonium salts.....								
	less than 0.00175% as NH <sub>3</sub>								
	Barium.....								
	less than 0.0022%								
	Arsenic.....								
	less than 0.0002%								
	Nitrates.....								
	less than 0.0032% as N <sub>2</sub> O <sub>5</sub>								
CALCIUM	Chloride, fused, tested reagent.....	Merck Blue Label		.80		incl	1/4 lb.	.30	incl
"	Chloride, anhydrous, sticks.....			.50	cb .09		1/4 lb.	.40	incl
"	Chromate, c. p.....			1.25	cb .08		1/4 lb.	.40	incl
"	Fluoride, native, powder.....			.10	cc .04				
"	Fluoride, c. p.....	Baker Analyzed		1.00	cb .08		1/4 lb.	.35	incl
"	Formate, c. p.....	Baker Analyzed		2.00	cb .08		1/4 lb.	.65	incl
"	Hydroxide, pure.....	Baker Analyzed		.40	cb .08		1/4 lb.	.25	incl
"	Hydroxide.....	Merck Blue Label		.60		incl	1/4 lb.	.25	incl
	Carbonates.....								
	less than 5% CO <sub>2</sub>								
	Silica.....								
	less than 0.1%								
	Alumina.....								
	less than 0.25% Al								
	Sulphates.....								
	less than 0.03% as SO <sub>2</sub>								
	Chlorides.....								
	less than 0.002% as Cl								
CALCIUM	Hypochlorite (Bleaching Powder) (Oxychloride).....						1 can	.10	incl
"	Hypochlorite.....						10 lb.	.60	incl
"	Hypochlorite, c. p., (Oxychloride).....			.55	cb .08		1/4 lb.	.25	incl
CALCIUM	Lactate.....		.10	cb .03	.70	cb .09			
"	Nitrate, pure.....			.80	cc .05				
"	Nitrate, c. p.....	Baker Analyzed	.15	incl	.90	cb .08	1/4 lb.	.35	incl
	Fe.....								
	0.001%								
	MgO.....								
	0.002%								
	BaO.....								
	0.001%								
	SO <sub>2</sub> .....								
CALCIUM	Oxalate, c. p.....	Baker Analyzed		1.40	cb .08		1/4 lb.	.40	incl
"	Oxide (Caustic Lime).....			.10	cc .05				

## A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages			
		per oz.		per lb.		size pkg.		per pkg.	
		cont.		cont.					

		Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>CALCIUM</b>	<b>Sulphate</b> .....	Kahlbaum "C.f.A."						
	Iron Oxide.....	none						
	Alkalies and Magnesia present	after precipitating Calcium..... 3 mg.						
	Magnesia.....	trace						
<b>CALCIUM</b>	<b>Sulphide, pure</b> .....	In 10 grams { Certified Analysis						
"	<b>Sulphide, cubes, according to</b>	Professor Otto.....						
"	<b>Sulphide</b> .....	Merck Blue Label						
	Arsenic.....	less than 0.0001%						
<b>CALCIUM</b>	<b>Sulphite, c. p.</b> .....	Baker Analyzed						
"	<b>Tartrate, c. p.</b> .....	Baker Analyzed						
<b>CANADA</b>	<b>Balsam</b> (See Microscopic Mounting Media).....							
<b>CAMPHOR</b>	<b>refined</b> .....							
<b>*CARBON</b>	<b>Bisulphide, coml.</b> (also furnished in 25, 50, 100 and 500 lb. cans, and 1000 lb. drums. Price on application).....							
<b>*CARBON</b>	<b>Bisulphide, c. p.</b> .....	Baker Analyzed						
	Sp. gr.....	1.27%						
	B. P.....	46-49°C						
	SO <sub>2</sub> .....	none						
	Free Sulphur.....	none						
	Nonvolatile matter.....	-0.001%						
<b>*CARBON</b>	<b>Bisulphide</b> .....	Merck Blue Label						
	Nonvolatile matter.....	less than 0.0008%						
	Hydrogen Sulphide and foreign organic Sulphur compounds.....	none						
	Sulphuric and Sulphurous Acids.....	none						
<b>CARBON</b>	<b>Dioxide</b> , supplied in seamless steel cylinders containing 20 lbs. each.....							
	Cylinders purchased from us will be refilled at \$3.00 each.							
"	<b>Tetrachloride, coml.</b> .....							
"	<b>Tetrachloride, pure</b> .....							
"	<b>Tetrachloride, c. p.</b> .....	Baker Analyzed						
	Sp. gr.....	1.629						
	B. P.....	76°C						
	Free Chlorine.....	none						
	H <sub>2</sub> S.....	none						
	Nonvolatile matter.....	0.0004%						
<b>CARBON</b>	<b>Tetrachloride</b> .....	Merck Blue Label						
	Nonvolatile matter.....	less than 0.00125%						
	Chlorine.....	less than 0.0001%						
	Hydrochloric Acid.....	less than 0.0001% as Cl						
	Organic matter.....	none						
	Aldehyde.....	none						
	Carbon Disulphide.....	less than 0.02%						
<b>CARBORUNDUM</b>	<b>powder, 40, 60, 80, 100 and 180 mesh</b> .....							
<b>CARD TEETH</b> .....								
<b>CARMINE, No. 40</b> .....								
<b>CARMINE</b>	<b>Tested for</b> .....	proper solubility						
	Water.....	not more than 25%						
	Ash.....	not more than 8%						
<b>CARMINE-Fibrin</b> , tested reagent.....								
<b>CASEIN</b> , from milk, washed.....								
"	according to Hammarstein.....							
<b>CASEIN-Sodium</b> (Nutrose), in original containers.....								
<b>°CELLOIDIN</b> shreds.....	Schering	1.00						
<b>CEMENT, Gutta Percha</b> , for sealing museum jars.....		100 grm.						
"	<b>Gutta Percha</b> , for sealing museum jars.....	500 grm.						
<b>CERESINE</b> , black.....								
"	white.....							
"	yellow.....							
<b>CERIUM</b> Nitrate, granular.....								
"	Nitrate, c. p.....							
"	Oxalate, pure.....							
<b>°CHARCOAL</b> , animal, granular.....								
"	animal, powder.....							
"	animal, purified.....							
"	animal, treated with acid, and washed, moist.....							
"	animal, c. p., dry.....							



	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
CHARCOAL, animal, c. p., powdered.....				2.50	incl			
CHARCOAL, animal, tested reagent.....	Merck Blue Label	.25	incl			½ lb.	1.40	incl
CHARCOAL, blood, c. p.....				2.80	incl			
CHARCOAL, blood, purified by acid.....	Merck Blue Label	.30	incl			½ lb.	1.75	incl
Material soluble in Water.....not more than 0.3%								
Material soluble in Alcohol.....not more than 0.15%								
Residue.....less than 0.05% as $\text{SO}_2$								
.....less than 0.01% as $\text{Cl}$								
Nitrates.....less than 0.016% as $\text{N}_2\text{O}_5$								
Copper.....less than 0.002%								
Iron.....less than 0.02%								
Calcium.....less than 0.025%								
Residue on ignition.....not more than 10%								
Hydrogen Sulphide.....less than 0.001% as $\text{S}$								
Tested for.....Decolorizing power.								
CHARCOAL, from sugar, c. p.....				2.50	incl	¼ lb.	.75	incl
wood, powder.....				.10 cc	.06			
wood, lumps.....				.10 cc	.06			
CHLORAL Hydrate, crystals.....				.60	incl			
CHLOROTONE.....		1.00	incl					
CHLORINATED Lime, cubes, for generating $\text{Cl}$ .....				.30 cb	.10			
Lime, cubes.....	Merck Blue Label			.35	incl			
Active chlorine.....yields at least 25% by weight								
CHLORINE Water.....	Merck Blue Label			.50	incl			
Nonvolatile matter.....less than 0.0025%								
Hydrochloric Acid.....less than 0.018%								
CHLOROFORM, U. S. P.....				.40 cb	.08	5 lb.	1.90	cb .14
CHLOROFORM, c. p.....	Baker Analyzed			1.00 cb	.08			
Sp. gr.....1.48								
B. P.....62°C								
Free acid.....none								
Alcohol.....-0.93%								
CHLOROFORM.....	Merck Blue Label			.60	incl	¼ lb.	.25	incl
Nonvolatile matter.....less than 0.0014%								
Hydrochloric Acid.....less than 0.0001%								
Free Chlorine.....less than 0.0002%								
Phosgen.....none								
Aldehyde.....none								
Foreign organic matter.....none								
CHOLESTERIN.....	Kahlbaum					10 grm.	2.50	incl
CHROMIUM, metal, c. p., crystals.....						1 grm.	.50	incl
Acetate, c. p., basic.....	Baker Analyzed			2.00 cb	.08	¼ lb.	.65	incl
Ammonium Sulphate, c. p. (30% solution).....	Baker Analyzed			1.00 cb	.08			
Carbonate, c. p., basic.....	Baker Analyzed			2.50 cb	.10	¼ lb.	.75	incl
Chloride, c. p. (50% solution).....	Baker Analyzed			.75 gb	.15	¼ lb.	.25	incl
Fe.....0.050%								
Ni.....none								
Cu.....none								
$\text{SO}_2$ .....0.050%								
CHROMIUM Chloride, c. p., dry.....		.15	incl	1.50 cb	.08	¼ lb.	.50	incl
Hydroxide, c. p.....	Baker Analyzed			1.00 cb	.09	¼ lb.	.35	incl
Nitrate, c. p. (40% solution).....	Baker Analyzed			1.00 gb	.13			
Nitrate, c. p., dry.....		.20	incl	2.00 cb	.08	¼ lb.	.65	incl
Oxide, c. p.....	Baker Analyzed			1.15 cb	.09			
Potassium Sulphate, pure crystals (Chromic Alum).....				.15 cc	.05			
Potassium Sulphate, powder.....				.18 cc	.05			
Potassium Sulphate, c. p.....	Baker Analyzed	.10	incl	.30 cb	.08	¼ lb.	.15	incl
Fe.....0.025%								
$\text{CaO}$ .....0.001%								
$\text{MgO}$ .....0.0001%								
$\text{Cl}$ .....-0.001%								
CHROMIUM Sulphate, c. p. (30% solution).....	Baker Analyzed			.80 gb	.15	¼ lb.	.35	incl
Sulphate, c. p., dry.....		.20	incl	1.75 cb	.08	¼ lb.	.60	incl
Trioxide (See Chromic Acid).....								
CHRYSAROBIN.....				3.50	incl	¼ lb.	1.00	incl
CINNABAR, red.....				1.50 cb	.08			
COBALT, metal, 98-99% cubes.....		.50	cb .03					
metal, c. p., (Nickel free).....						10 grm.	.50	incl
Acetate, c. p.....				4.00 cb	.08	¼ lb.	1.25	incl
Ammonium Sulphate, c. p.....				2.00 cb	.08	¼ lb.	.65	incl
Bromide, c. p.....		.50	incl					
Carbonate, c. p.....	Baker Analyzed			2.50 cb	.10	¼ lb.	.75	incl
Chloride, c. p.....	Baker Analyzed			2.50 cb	.08	¼ lb.	.75	incl
Chloride, c. p. (Nickel free).....	Baker Special	.75	incl					
Chloride (Nickel free).....	Kahlbaum.....	.75	incl					

		maker or Brand	per oz.	cont.	per lb.	size pkg.	per pkg.	cont.
COBALT	Nitrate, c. p.	Baker Analyzed	.20	incl	2.00 cb	.08	1 1/4 lb.	.65
	Fe.....	0.008%						
	Ni.....	trace						
	Cu.....	none						
	SO <sub>2</sub> .....	none						
COBALT	Nitrate	Merck Blue Label	.40	incl			1 1/4 lb.	1.35
	Sulphates.....	less than 0.01% as SO <sub>2</sub>						
	Chlorides.....	less than 0.002% as Cl						
	Alkali salts.....	not more than 0.25%						
	Zinc.....	less than 0.5%						
	Lead.....	less than 0.02%						
	Copper.....	less than 0.002%						
COBALT	Nitrate, c. p. (Nickel free)	Baker Special	.75	incl				
"	Nitrate (Nickel free)	Kahlbaum	.75	incl				
"	Nitrate (Nickel free)	Merck Blue Label	.75	incl			1 1/4 oz.	.25
	Nickel.....	less than 0.02%						
	Sulphates.....	less than 0.01% as SO <sub>2</sub>						
	Chlorides.....	less than 0.002% as Cl						
	Alkali salts.....	not more than 0.25%						
	Zinc.....	not more than 0.5%						
	Lead.....	less than 0.02%						
	Copper.....	less than 0.002%						
COBALT	Oxalate, c. p.				3.50 cb	.09	1 1/4 lb.	1.05
"	Oxide, c. p.	Baker Analyzed			3.00 cb	.06	1 1/4 lb.	.95
"	Oxide	Merck Blue Label	1.00	incl			1 1/4 oz.	.35
	Sulphur.....	less than 0.0006%						
"	Sodium Nitrite, c. p.		.50	incl				
"	Sulphate, c. p.	Baker Analyzed			1.75 cb	.08	1 1/4 lb.	.60
	Fe.....	0.150%						
	Ni.....	0.012%						
	Cu.....	none						
	Cl.....	—0.001%						
COBALT	Sulphate, c. p. (Nickel free)	Baker Special	.30	incl				
COCHINEAL	bugs.....				.75 cc	.06		
"	powder.....				.85 cc	.05		
COLLODION	U. S. P.				.55	incl		
"	4%.....	Merck Blue Label			.60	incl	1 1/4 lb.	.25
	Acids.....	none						
	Residue.....	3.8-4.0%						
COLOPHONY	(Rosin), yellow, lump.....				.10 cc	.04		
"	(Rosin), white, lump.....				.12 cc	.04		
CONGO	(See Test Paper)							
COPPER	metal, shot form.....				.40 cc	.04		
"	metal, turnings short.....				.45	incl		
"	metal, granulated.....				.60	incl		
"	metal, sheet .008 in.....				.75	incl		
"	metal, by Electrolysis.....	Merck Blue Label			1.00	incl	1 1/4 lb.	.35
	Foreign metals (Sb, Sn, Pb, As).....	none						
	(Fe <sub>2</sub> O <sub>3</sub> +Bi <sub>2</sub> O <sub>3</sub> ).....	less than 0.01%						
	" " (total metals).....	not more than 0.02%						
	Arsenic.....	less than 0.0001%						
COPPER	metal, foil .002 in.....				1.50	incl		
"	metal, c. p., foil, 0.06-0.1 mm.....		.15	incl	1.50	incl		
"	Acetate (Verdigris), powdered.....				.40 cb	.08		
"	Acetate, pure, crystals, neutral.....				.55 cb	.09		
"	Acetate, c. p.....	Baker Analyzed			.60 cb	.08		
"	Aceto Arsenite, c. p.....				2.50 cb	.08		
"	Ammonium Chloride, c. p.....	Baker Analyzed			.50 cb	.08	1 1/4 lb.	.20
	CuCl <sub>2</sub> .....	48.47%						
	Fe.....	0.0035%						
	SO <sub>2</sub> .....	0.001%						
	Carbon (soluble).....	none						
	Nitrate.....	none						
COPPER	Ammonium Chloride.....	Merck Blue Label			1.00	incl	1 1/4 lb.	.35
	Free acids.....	none						
	Sulphates.....	less than 0.01% as SO <sub>2</sub>						
	Salts of the alkalies, earths, etc.....	not more than 0.066%						
	Iron.....	not more than 0.014%						

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
COPPER	Chloride, c. p. (cupric).....	Baker Analyzed	.10	incl	.60	cb .03	¼ lb.	.22	incl
	SO <sub>2</sub> .....								
	Fe.....								
	Pb.....								
	Nitrate.....								
COPPER	Chloride, (cupric).....	Merck Blue Label	.20	incl			½ lb.	.90	incl
	Substances insoluble in Alcohol.....								
	Sulphates.....								
	Salts of the alkali metals.....								
	Iron.....								
	Arsenic.....								
COPPER	Chloride (cupric).....	Kahlbaum "C.f.A."					100 grm.	.95	incl
"	Chloride (cupric).....	Kahlbaum "C.f.A."					500 grm.	2.70	incl
	Iron.....								
	Alkaline residue present after precipitating Copper.....								
	Arsenic.....								
	Sulphate.....								
	Solubility in Alcohol.....								
COPPER	Chloride, c. p. (cuprous).....	Baker Analyzed	.15	incl	1.50	cb .06	¼ lb.	.45	incl
	SO <sub>2</sub> .....								
	Fe.....								
	Na.....								
	CuCl <sub>2</sub> .....								
COPPER	Chloride (cuprous).....	Merck Blue Label	.20	incl			¼ lb.	.90	incl
"	Chloride (cuprous).....	Kahlbaum "C.f.A."					100 grm.	1.00	incl
"	Chloride (cuprous).....	Kahlbaum "C.f.A."					500 grm.	3.10	incl
	Residue present after precipitating Copper.....								
	Iron Oxide.....								
	Color.....								
COPPER	Hydroxide, c. p.....	Merck Blue Label	.25	incl	.90	cb .08	¼ lb.	.35	incl
"	Sulphates.....						½ lb.	1.25	incl
	Alkalies.....								
"	Nitrate, pure crystals.....				.45	cb .03	¼ lb.	.24	incl
"	Nitrate, c. p.....	Baker Analyzed	.10	incl	.65	cb .07	¼ lb.	.24	incl
	Fe.....								
	SO <sub>2</sub> .....								
COPPER	Oxalate, c. p.....	Baker Analyzed			1.50	cb .03	¼ lb.	.45	incl
"	Oxide, c. p., black, fine.....	Baker Analyzed			.80	cb .06	¼ lb.	.35	incl
"	Oxide, c. p., black, coarse.....	Baker Analyzed			1.00	cb .06	¼ lb.	.35	incl
	Fe.....								
	SO <sub>2</sub> .....								
	Nitrate.....								
COPPER	Oxide, c. p., wire.....	Baker Analyzed			1.50	cb .07	¼ lb.	.45	incl
	Fe.....								
	Al <sub>2</sub> O <sub>3</sub> .....								
COPPER	Oxide, c. p., red.....	Baker Analyzed			1.50	cb .07	¼ lb.	.45	incl
	SO <sub>2</sub> .....								
	Cl.....								
	Fe.....								
COPPER	Oxide Asbestos.....	Merck Blue Label	1.00	incl			¼ oz.	.35	incl
"	Phosphate, c. p.....	Baker Analyzed			2.00	cb .10	¼ lb.	.65	incl
"	Potassium Chloride, c. p.....	Baker Analyzed			.45	cb .07	¼ lb.	.20	incl
	CuCl <sub>2</sub> .....								
	Fe.....								
	SO <sub>2</sub> .....								
	Nitrate.....								
	Carbon (soluble).....								
COPPER	Potassium Sulphate, c. p.....	Baker Analyzed			.50	cb .07	¼ lb.	.20	incl
"	Sulphate, coml., crystals (Blue Stone).....				.10	cc .05			
"	Sulphate, coml., (powder).....				.15	cc .05			
"	Sulphate, pure, crystals.....				.20	cb .07			
"	Sulphate, c. p., crystals, coarse or fine.....	Baker Analyzed			.27	cb .07	¼ lb.	.15	incl
	Fe.....								
	Cl.....								
COPPER	Sulphate.....	Merck Blue Label			.60	incl	¼ lb.	.25	incl
	Salts of the alkalies, earth, etc.....								
	Iron.....								
COPPER	Sulphate.....	Kahlbaum "C.f.A."					500 grm.	1.15	incl
"	Sulphate.....	Kahlbaum "C.f.A."					1000 grm.	1.95	incl
	Iron.....								
	Alkalies present after precipitating Copper.....								
	Other metals.....								
COPPER	Sulphate, c. p., cryst. precip. by Alcohol.....	Baker Special			.50	cb .07	¼ lb.	.20	incl
	Fe.....								
	Cl.....								
COPPER	Sulphate, c. p., anhydrous.....	Baker Analyzed	.10	incl	.70	cb .07	¼ lb.	.24	incl
"	Sulphate, anhydrous in pumice.....				.50	cb .08			

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
COPPER, Sulphide, c. p.				1.25 cb	.07	¼ lb.	.40	incl
“ Thiocyanate, c. p. (cuprous)....	Baker Analyzed			1.60 cb	.08	¼ lb.	.60	incl
COTTON, absorbent.....				.35	incl			
“ non-absorbent.....				.25	incl			
“ wool, specially selected for plugging culture tubes.....				.67 cb	.08			
CREOLIN, Pearson's.....				.80 gb	.09			
°CREOSOTE, from Beechwood as recommended for use in biological laboratories.....				.40 gb	.09			
“ from coal tar.....				.25 cb	.09	5 lb.	1.10 cb	.15
CRESOL, U. S. P.....								
CUBES, Chlorine, for generating Chlorine (Also see Chlorinated Lime).....				.30 cb	.10			
* “ Oxygen, for generating Oxygen (Also see Oxone).....						2 lb.	1.50	incl
“ Sulphide, for generating Sulphuretted Hydrogen.....				.45 cb	.10			
“ Sulphite, for generating Sulphurous acid.....				.50 cb	.10			
“ Acid Sulphurous, 20%, tested reagent.....	Merck Blue Label			.60	incl	¼ lb.	.25	incl
CUMARIN.....		.35 cb	.03					
CUMOL.....				.70 cb	.10			
CURARE, tested.....						15 grs.	1.35	incl
DEVARDA'S ALLOY (See metal)								
DEXTRINE, yellow, coml.....				.10 cc	.05			
“ white, coml.....				.10 cc	.05			
“ c. p., alcohol precipitated.....				.90 cb	.09			
DEXTROSE (Glucose) white, lump.....				.10 cc	.06			
“ anhydrous, pure, granular.....				.15 cc	.05			
“ c. p., anhydrous.....		.15 cb	.03	1.40 cb	.08			
DI-AMIDO-BENZOL (See Phenylene-diamine)								
°DIAMOND INK.....				.55	incl			
DIASTASE of Malt (Maltine).....				.65 cb	.04			
DICHLORETHYLENE.....				.35 cb	.08			
DICYANDIAMIDINE SULPHATE.....	Merck Blue Label	.60	incl			¼ oz.	.20	incl
Tested for suitability as a reagent for Nickel								
DIMETHYL-AMIDO-BENZALDEHYDE (Para).....	Kahlbaum					10 grm.	1.00	incl
DIMETHYL-AMIDO-BENZOL (See Dimethyl-aniline)								
DIMETHYL-AMIDO-AZO-BENZOL (Para), c. p.....				.90 cb	.03			
DIMETHYL-ANILINE.....				.15 cb	.03			
DIMETHYL-GLOXIME.....		1.50	incl	1.80 cb	.09			
“.....	Merck Blue Label	2.00	incl			¼ lb.	4.75	incl
“.....	Merck Blue Label					¼ lb.	7.50	incl
Tested for suitability as a reagent for Nickel						½ oz.	.35	incl
DIMETHYL-PARAPHENYLENE-DIAMINE HYDROCHLORIDE.....	Merck Blue Label					¼ oz.	1.25	incl
DIMETHYL-PARAPHENYLENE-DIAMINE HYDROCHLORIDE.....	Merck Blue Label					15 grn.	.30	incl
Nonvolatile matter.....less than 0.05%								
DIMETHYLSULPHATE.....				1.30	incl			
DIPHENYLAMINE, c. p., crystals, whitest.....		.25 cb	.03	2.50 cb	.08			
DIPHENYLAMINE.....	Merck Blue Label	.25	incl					
Nitric Acid.....less than 0.05% as N <sub>2</sub> O <sub>5</sub>	Guaranteed Analysis							
Aniline.....less than 0.05%								
DISTILLED WATER, in 5 gal. crated bottle.....						5 gal.	.75	1.00
DULCITE (Melampyrite).....						5 grm.	4.50	incl
DUTCH LEAF.....						book	.10	incl
EDINOL.....		.70 cb	.03					
EIKONOGON.....		.35 cb	.03					
EMERY, fine, 180 mesh.....				.15 cc	.04			
“ medium, 80 mesh.....				.12 cc	.04			
“ coarse, 40 mesh.....				.10 cc	.04			
ESCHKA'S Mixture (See Magnesium Oxide and Sodium Carbonate).								
°ETHER (Sulphuric), U. S. P.....						¼ lb.	.15	incl
“ (Sulphuric), U. S. P.....						½ lb.	.20	incl



		Ounce and pound prices				Price in other size packages				
		Maker or Brand		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
°ETHER	(Sulphuric), U. S. P.					.36	incl	2 lb.	.68	incl
° "	(Sulphuric), U. S. P.							3 lb.	.96	incl
° "	(Sulphuric), U. S. P.							5 lb.	1.55	incl
° "	(Sulphuric), U. S. P., in drums					.20		55 lb.	11.00	4.00
°ETHER	(Sulphuric), U. S. P.	Baker Analyzed				.40	cn .10	¼ lb.	.20	incl
	Sp. gr.									
	B. P.									
	Alcohol									
	Water									
°ETHER	(Sulphuric), concentrated	Squibb						¼ lb.	.26	incl
° "	(Sulphuric), concentrated	Squibb						½ lb.	.45	incl
° "	(Sulphuric), concentrated	Squibb				.80	incl	1 kilo	1.70	incl
°ETHER	(Sulphuric), sp. gr. 0.720	Merck Blue Label				.70	incl			
	Residue									
	Ethyl Peroxide, Hydrogen Peroxide, and Ozone									
	Aldehydes and Vinyl Alcohol									
	Sulphur compounds									
	Acetone									
	Water									
°ETHER	(Sulphuric), washed	Baker Analyzed				.40	incl			
° "	(Sulphuric), washed	Baker Analyzed				.95	cn .10	¼ lb.	.35	incl
	Alcohol									
	Water									
°ETHER,	distilled over Sodium	Baker Analyzed				1.25	cn .10			
	Alcohol									
	Water									
°ETHER,	distilled over Sodium	Kahlbaum						500 grm.	1.35	incl
° "	distilled over Sodium	Merck Blue Label				.80	incl			
	Residue									
	Ethyl Peroxide, Hydrogen Peroxide and Ozone									
	Aldehydes and Vinyl Alcohol									
	Sulphur compounds									
	Water									
	Alcohol									
ETHER,	Acetic, 90%, U. S. P.	Baker Analyzed				.70	cb .09			
° "	Acetic, 98½%	Baker Analyzed				.80	cb .09			
° "	Acetic, c. p., absolute	Baker Analyzed				1.50	cb .08			
	Sp. gr.									
	B. P.									
	Alcohol									
	Acetic Acid									
	Water									
°ETHER,	Butyric, 98% (So-called absolute)					1.75	cb .09			
° "	Petroleum, 40-65 " b. p.							1 pt.	.25	cb .08
								1 gal.	1.00	cn .25
°ETHER,	Petroleum					.40	cn .10	1 gal.	2.00	cn .25
	Sp. gr.									
	B. P.									
°ETHER,	Petroleum, 25-40 " b. p.	Baker Special				.60	cn .10			
° "	Petroleum (Benzin)	Merck Blue Label				.50	incl			
	Nonvolatile matter and heavy oils									
	Acids									
	Sulphur compounds and reducing agents									
FELDSPAR,	powder					.10	cc .04			
FEHLING'S	Alkaline Solution					.50	cb .08			
"	Copper Solution					.50	gb .12			
FIBRIN,	from blood					.30	cb .03			
FIRE CLAY										
FLUORCHROME						.10	cc .05			
FLUORSPAR,	powdered (See Calcium Fluoride)					.20	incl			
FORMALDEHYDE,	Solution, U. S. P.					.10	cc .04			
"	"					.20	cb .08	5 lb.	.90	cb .20
"	"					.17		9 lb.	1.53	cb .25
"	"					.12		100 lb.	12.00	cb 2.00
"	(40% solution)	Baker Analyzed				.30	cb .08			
"FORMALIN"		Schering				.45	incl			
FULLER'S EARTH						.10	incl			
FURFURAL						.75	cb .04			
FURFURAL,	tested reagent	Merck Blue Label						25 grm.	1.50	incl
"	tested reagent	Merck Blue Label						5 grm.	.40	incl
FUSEL OIL	(See Amyl Alcohol)									
GALACTOSE						.80	cb .04			
GALLEIN,	dry, tested reagent	Merck Blue Label				1.50	incl	¼ oz.	.50	incl
GALLNUTS,	native black					.30	incl			
"	powdered					.45	cc .06			
GELATINE,	Gold Label, specially selected for preparation of bacteriological culture media	A. H. T. Co. #33				.60	incl			

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages	
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg. cont.
GELATINE, Extra, for preparation of bacteriological culture media...	Coignet			1.00	incl		
GLASS WOOL, best Bohemian, Lead free...		.65	incl	6.00	incl	1/4 lb.	2.25 incl
" best Bohemian, coarse...		.50	incl	5.00	incl	1/4 lb.	1.75 incl
" best Bohemian, fine...		.55	incl	5.75	incl	1/4 lb.	2.00 incl
GLASS WOOL, Material soluble in Hydrochloric Acid...not more than 0.8% Lead...less than 0.0025%	Merck Blue Label	.50	incl			1/4 lb.	1.50 incl
GLASS, Powder...				.10	incl		
GLUCOSE (Dextrose), white, lump...				.10	cc .06		
" (Dextrose), c. p. anhydrous...		.15	cb .03	1.40	cb .08		
GLYCERIN, c. p., neutral...				.35	cb .08	5 lb.	1.60 cn .18
" c. p., neutral...				.8		10 lb.	2.80 cn .25
" c. p., neutral...				.25		50 lb.	12.50 incl
In drums of 550 or 1100 lbs., price on application.							
GLYCERIN, sp. gr. 1.25...	Merck Blue Label			.60	incl		
Tested for...							
Arsenic...less than 0.0012%							
Inorganic matter...less than 0.008%							
Substances which reduce Ammoniacal Silver Nitrate solution...none							
Fatty acid esters...less than 0.115% as Ethyl Butyrate							
Hydrochloric Acid and Chlorides...less than 0.0004% as Cl							
Sulphuric Acid...less than 0.0024% as SO							
Ovalic Acid...less than 0.0064%							
Heavy metals...none							
Calcium...less than 0.005%							
Sugars...less than 0.04% as Saccharose							
Readily carbonizable matter...none							
Dextrose and organic bodies...none							
Ammonium compounds...less than 0.003% as NH <sub>3</sub>							
GLYCERIN, sp. gr. 1.23...	Merck Blue Label			.60	incl		
Same impurities as above.							
GLYCOCOLL						15 gr.	.35 incl
GOLD LEAF						book	.50 incl
" Chloride, pure, crystals...						15 gr.	.45 incl
GRAPE SUGAR (See Glucose or Dextrose).							
GRAPHITE, powder...				.15	cc .06		
GUAIACIN, tested reagent...	Merck Blue Label					1/2 oz.	.80 incl
GUM Arabic, white, granular...		.10	cc .03	.60	cc .05		
" Arabic, white, powder...		.10	cc .03	.60	cc .05		
" Camphor, refined...				1.00	cc .06		
" Damar...				.45	cc .05		
" Guaiac...				.50	cc .05		
" Mastic, tears...				1.15	incl		
" Shellac, orange, flake...				.45	cc .04		
" Shellac, bleached...				.50	cc .04		
" Tragacanth, powdered...				1.00	cc .05		
GYPSUM (Calcium Sulphate)...				.10	cc .05		
HAEMOGLOBIN, powder...		.30	cb .04				
" scales...		.25	cb .03				
HEMATEIN, tested reagent...	Merck Blue Label					1/2 oz.	.60 incl
(See also Gruenblers Stains)							
HEMATOXYLIN, tested reagent...	Merck Blue Label					1/2 oz.	1.10 incl
" "	Merck Blue Label					1/2 oz.	.30 incl
(See also Gruenblers Stains)							
HIDE POWDER, for standardizing...				3.50	incl	1/4 lb.	1.05 incl
" American Standard...		.40	cc .03	4.00	cc .06	5 lb.	18.75 incl
" tested reagent...	Merck Blue Label	.50	incl			1/4 lb.	1.50 incl
HIRUDIN, for preventing coagulation of blood, 1 milligram of Hirudin keeps 7 1/2 cc. of blood in a liquid condition...						1/16 grm.	3.75 incl
" same as above...						1/16 grm.	.75 incl
HYDRAZINE Sulphate...	Merck Blue Label	1.00	incl			1/4 oz.	.35 incl
Chlorides...less than 0.002% as Cl							
Heavy metals...none							
Nonvolatile matter...less than 0.05%							
HYDROCHINONE...		.15	incl	.80	incl	1/4 lb.	.25 incl
HYDROGEN Peroxide, U. S. P.				.20	incl	5 lb.	.80 incl
HYDROGEN Peroxide, c. p.	Baker Analyzed			.50	cb .08		
H <sub>2</sub> O <sub>2</sub> ...2.90%							
Fe...0.001%							
SO <sub>2</sub> ...0.025%							
MgO...0.005%							
Nonvolatile matter...0.100%							
HYDROGEN Peroxide	Marchand			.75	incl		

		Ounce and pound prices			Price in other size packages		
	Maker or Brand	per oz.	cont.	per lb.	cont.	size pkg.	per pkg.
<b>HYDROGEN Peroxide (Dioxogen) .....</b>	Oakland Chem. Co.	.65	incl				
" <b>Peroxide (30% weight) .....</b>	Merck Blue Label					200 grm.	2.50 incl
" <b>Peroxide (30% weight) .....</b>	Merck Blue Label					50 grm.	.85 incl
Free acids.....none							
Sulphuric Acid.....less than 0.0075% as SO <sub>3</sub>							
Residue on evaporation —							
Sulphuric and Phosphoric							
Acids, etc.).....less than 0.0045%							
Oxalic Acid.....less than 0.03%							
Hydrochloric Acid.....less than 0.0005% as Cl							
Hydrofluoric Acid.....less than 0.003%							
Phosphoric Acid.....less than 0.0006% as P <sub>2</sub> O <sub>5</sub>							
Heavy metals.....at most a trace							
Arsenic.....less than 0.0015%							
<b>HYDROGEN Sulphide Water.....</b>	Merck Blue Label	.50	incl				
Iron.....none							
<b>HYDROXYLAMINE Hydrochloride.....</b>	Merck Blue Label	1.00	incl			¼ oz.	.30 incl
Nonvolatile matter.....less than 0.05%							
Ammonium Chloride.....less than 0.3%							
Sulphuric Acid.....less than 0.0005% as SO <sub>3</sub>							
Heavy metals.....at most a trace							
Arsenic.....less than 0.0015%							
<b>ICELAND SPAR, for standardizing.....</b>		.40	incl				
<b>INDIGO, Madras, lump.....</b>				.75	cc .04		
" <b>Bengal, lump.....</b>		.10	incl	1.25	cc .04		
<b>INDIGO, Vegetable, 60%.....</b>	Merck Blue Label	.40	incl				
Ash.....not more than 12%							
Moisture.....not more than 6%							
<b>INDIGO Synthetic, 95%.....</b>	Merck Blue Label	.50	incl			¼ oz.	.20 incl
Ash.....not more than 1%							
Moisture.....not more than 1%							
<b>INDIGO Solution, 1-40.....</b>	Merck Blue Label			.75	incl	¼ lb.	.30 incl
<b>INDIGO Solution, 1-1000.....</b>	Merck Blue Label			.75	incl	¼ lb.	.30 incl
<b>INDOL.....</b>						⅛ grm.	.55 incl
						1 grm.	3.00 incl
<b>INFUSORIAL EARTH (Kieselguhr).....</b>				.10	cc .04		
<b>INULIN, white (Alant Starch).....</b>						10 grm.	.15 incl
" <b>Dragendorff.....</b>						10 grm.	.25 incl
" <b>Kiliani.....</b>		.60	incl			10 grm.	.25 incl
<b>IODEOSIN.....</b>	Merck Blue Label	.75	incl			¼ oz.	.25 incl
Tested.....for sensitiveness							
<b>IODINE, pure, resublimed.....</b>		.35	gb	.07	4.25 gb .13		
<b>IODINE, resublimed.....</b>	Merck Blue Label	.45	incl	5.50	incl	¼ lb.	1.50 incl
Nonvolatile matter.....less than 0.05%							
Cyanogen.....less than 0.05%							
Chlorine and							
Bromine.....less than 0.12% total as Cl							
<b>IODINE Pentoxide, c. p. ....</b>		1.10	incl				
<b>IODINE Water.....</b>	Merck Blue Label			.50	incl		
Tested.....for strength							
<b>IRON Filings, coarse.....</b>				.10	cc .04		
" <b>Filings, fine.....</b>				.10	cc .04		
" <b>by Hydrogen, 90%.....</b>				.55	cb .08		
<b>IRON by Hydrogen.....</b>	Merck Blue Label			1.25	incl	¼ lb.	.40 incl
Residue insoluble in							
Sulphuric Acid.....not more than 0.5%							
Sulphides.....less than 0.0075% as S							
Sodium Carbonate.....not more than 0.06%							
Nitrogen.....not more than 0.0025%							
Arsenic.....less than 0.0015%							
<b>IRON, Powder.....</b>	Merck Blue Label			.50	incl	¼ lb.	.20 incl
Tested for insolubility in Hydrochloric Acid							
Nitrogen.....not more than 0.0025%							
Arsenic.....less than 0.0015%							
Foreign heavy metals.....none							
<b>IRON Wire, for standardizing, on spool.....</b>		.15	incl			¼ lb.	.30 incl
" <b>Wire. Same as above.....</b>						½ lb.	.45 incl
" <b>Wire, for standardizing on spool.....</b>	Merck Blue Label					50 grm.	.50 incl
" <b>Acetate, c. p., solution, (ferric).....</b>				.50	cb .08		
" <b>Ammonium Citrate (ferric).....</b>				1.25	cb .08	¼ lb.	.40 incl
" <b>Ammonium Oxalate, c. p. (ferric).....</b>	Baker Analyzed			.80	cb .08	¼ lb.	.30 incl
" <b>Ammonium Oxalate, c. p. (ferrous).....</b>	Baker Analyzed			.75	cb .08	¼ lb.	.25 incl
" <b>Ammonium Sulphate, c. p. (ferric).....</b>							
Iron Alum.....				.10	incl	.50	cb .08
Cl.....—0.001%						¼ lb.	.20 incl
Ferrous Salt.....trace							
Nitrate.....trace							
<b>IRON Ammonium Sulphate (ferric).....</b>	Merck Blue Label			.60	incl	¼ lb.	.25 incl
Ferrous salt.....less than 0.0025% Fe							
Chlorides.....less than 0.0003% as Cl							
Zinc.....less than 0.003%							
Copper.....less than 0.01%							
Alkali salts.....not more than 0.04%							

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
IRON	Ammonium Sulphate, c. p. (ferrous) Fe in one grain..... 0.142-0.143 Cu..... none P..... trace Zn..... none Cl..... 0.0002%	Baker Analyzed	.10	incl	.45 cb	.08	¼ lb.	.20	incl
		Typical Analysis							
IRON	Ammonium Sulphate (ferrous). Ferric salts..... less than 0.0008% Fe Copper..... less than 0.01% Zinc..... less than 0.003% Alkali salts..... less than 0.0167%	Merck Blue Label			.60	incl	¼ lb.	.25	incl
		Guaranteed Analysis							
IRON	Ammonium Sulphate, c. p. (ferrous) (Phosphorus free)	Baker Special			.75 cb	.08			
"	Ammonium Sulphate, c. p., (ferrous) large crystals, for standardizing...				.60 cb	.08	¼ lb.	.25	incl
"	Carbonate, c. p., moist (ferric)	Baker Analyzed			.50 cb	.08	¼ lb.	.20	incl
"	Carbonate, c. p., moist (ferrous)	Baker Analyzed			.35 cb	.07	¼ lb.	.15	incl
"	Chloride, pure, lump (ferric)				.25 cb	.09			
"	Chloride, c. p. (ferric)	Baker Analyzed	.10	incl	.35 cb	.08	¼ lb.	.17	incl
	Ferrous Salt..... none HCl..... trace SO <sub>2</sub> ..... 0.003% HNO <sub>3</sub> ..... trace P..... trace	Typical Analysis							
IRON	Chloride, c. p. (ferric) (Phosphorus free)	Baker Special	.15	incl	.90 cb	.08	¼ lb.	.35	incl
"	Chloride (ferric) Basic Salt and other Substances difficultly soluble in Water..... none Hydrochloric Acid..... less than 0.33% HCl and and Chlorine..... less than 0.001% Cl Arsenic..... less than 0.0011% Ferric salt..... less than 0.0025% Fe Copper..... less than 0.003% Zinc..... less than 0.015% Nitric Acid..... less than 0.025% as N <sub>2</sub> O <sub>5</sub> Alkali salts and Calcium..... not more than 0.0117% Sulphates..... less than 0.0025% as SO <sub>4</sub>	Merck Blue Label			.60	incl	¼ lb.	.25	incl
		Guaranteed Analysis							
IRON	Chloride, solution (ferric) The same in inclusions as above.	Merck Blue Label			.55	incl	¼ lb.	.25	incl
IRON	Chloride (ferric)	Kahlbaum "C.f.a."					100 grm.	.60	incl
"	Chloride (ferric) Free Hydrochloric Acid..... none Free Chlorine..... none Ferric salts..... none Sulphate..... none Nitrate..... none Alkalies and Calcium Oxide..... none Manganese..... none Copper..... none Arsenic..... none Basic salts..... none	Kahlbaum "C.f.a."					500 grm.	1.30	incl
		Certified Analysis							
IRON	Chloride, c. p. (ferrous) SO <sub>2</sub> ..... 0.005% Ferric Salt..... present	Baker Analyzed	.10	incl	.55 cb	.08	¼ lb.	.20	incl
		Typical Analysis							
IRON	Chloride (ferrous) Oxychloride..... at most a small amount Sulphates..... less than 0.0075% as SO <sub>2</sub> Copper..... less than 0.03% Zinc..... less than 0.0075% Alkali salts..... not more than 0.03% Arsenic..... less than 0.0013%	Merck Blue Label			.70	incl	¼ lb.	.30	incl
		Guaranteed Analysis							
IRON	Ferrocyanide, insoluble				.50 cb	.12			
"	Hydroxide, c. p., moist (ferric)	Baker Analyzed			.60 cb	.08	¼ lb.	.25	incl
IRON	Nitrate, c. p., crystals (ferric) Cl..... 0.003% SO <sub>4</sub> ..... 0.001% Free acid..... trace	Baker Analyzed	.10	incl	.80 gb	.15	¼ lb.	.27	incl
		Typical Analysis							
IRON	Nitrate (ferric)	Kahlbaum "C.f.a."					50 grm.	.80	incl
"	Nitrate (ferric) Sulphate..... none Chlorides..... none Alkalies..... none Iron Oxide..... 19.407% equivalent to Crystallized Ferric Nitrate..... 98.08% Moisture..... remainder	Kahlbaum "C.f.a."					200 grm.	2.00	incl
		Certified Analysis							
IRON	Oxalate, c. p., crystals (ferric)	Baker Analyzed			1.25 cb	.08	¼ lb.	.40	incl
"	Oxalate, c. p. (ferrous)	Baker Analyzed			1.00 cb	.08	¼ lb.	.35	incl
"	Oxide, red (ferric) (Jewelers rouge for polishing purposes)				.35 cb	.08			
IRON	Oxide, c. p. (ferric)	Baker Analyzed			.65 cb	.08	¼ lb.	.25	incl
"	Oxide, c. p., from Oxalate (ferric) Cl..... 0.005% SO <sub>2</sub> ..... 0.001%	Baker Special			1.25 cb	.08	¼ lb.	.40	incl
		Typical Analysis							



	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>IRON Oxide (ferric)</b> .....	Merck Blue Label	.80	incl			¼ oz.	.30	incl
Water and volatile sub-								
stances.....								
Substances soluble in water.....								
Chlorides.....								
Nitrates.....								
Sulphates.....								
Silicates.....								
Insoluble in water.....								
Substances insoluble in Hydrochloric								
Acid.....								
Foreign heavy metals.....								
Aluminum.....								
Calcium.....								
Magnesium.....								
<b>IRON Oxide (ferric)</b> .....	Kahlbaum "C.f.A."					50 grm.	1.70	incl
Ferric Oxide.....								
Moisture.....								
Manganese.....								
Alkalies.....								
<b>IRON Pyrites</b> .....				.10 cc	.04			
<b>" Sulphate, c. p. (ferric)</b> .....	Baker Analyzed			.35 cb	.08	¼ lb.	.15	incl
CaO.....								
HNO <sub>3</sub> .....								
Ferrous Salt.....								
<b>IRON Sulphate, coml. (ferrous) (Copperas)</b> .....				.10 cb	.08			
<b>" Sulphate, pure, crystals (ferrous)</b> .....				.12 cb	.08			
<b>" Sulphate, c. p. (ferrous)</b> .....	Baker Analyzed			.35 cb	.08	¼ lb.	.20	incl
P.....								
Cu.....								
Pb.....								
Cl.....								
Ferric Salt.....								
<b>IRON Sulphate (ferrous)</b> .....	Merck Blue Label			.50	incl	¼ lb.	.20	incl
Substances insoluble in Water.....								
Alkali salts.....								
Zinc.....								
Copper.....								
<b>IRON Sulphate, c. p., precipitated by alco-</b>				.50 cb	.08			
<b>" Sulphate, c. p., anhydrous (ferrous)</b> .....				.50 cb	.08			
<b>" Sulphide, fused, lump (ferrous)</b> .....				.12 cc	.04	100 lb.	8.00	incl
<b>" Sulphide, granular (ferrous)</b> .....				.12 cc	.04	100 lb.	8.00	incl
<b>" Sulphide, fused, sticks (ferrous)</b> .....				.15 cc	.05	100 lb.	13.00	incl
<b>" Sulphide, granular, sticks, or lumps,</b>								
<b>(ferrous) tested reagent.</b> .....	Merck Blue Label			.40	incl			
<b>KAOLIN</b> .....				.10 cc	.04			
acid washed.....				.20 cc	.04			
<b>KIESELGUHR Infusorial Earth</b> .....				.10 cc	.04			
<b>LACMOID, c. p., scales</b> .....				.65 cb	.04			
Tested for.....	Merck Blue Label	1.00	incl			¼ oz.	.35	incl
Sensitiveness.....								
<b>LACMUS (See Litmus).</b> .....								
<b>LACTOSE, powder Milk Sugar</b> .....				.22	incl			
<b>LACTOSE, c. p., free from Dextrose, for</b>								
<b>bacteriological work.</b> .....	Kahlbaum			.50 cb	.09			
<b>LAMPBLACK</b> .....				.15	incl			
<b>LEAD, in sheets</b> .....				.20	incl			
<b>" metal, free from silver, sheets, 6</b>								
<b>inches wide</b> .....				.25	incl			
<b>" foil (Test Lead), free from silver</b>								
<b>0.04 mm thick</b> .....				.80	incl			
<b>" granulated (Test Lead), free from</b>								
<b>silver</b> .....				.25 cb	.06			
<b>" metal, free from silver. Sticks 6</b>								
<b>inches by ½ inches</b> .....				.30	incl			
<b>" Acetate, coml., crystals</b> .....				.20 cb	.07			
<b>" Acetate, pure</b> .....				.25 cb	.07			
<b>LEAD Acetate, c. p.</b> .....	Baker Analyzed			.30 cb	.07			
Fe.....								
Cl.....								
CaO.....								
Na.....								
<b>LEAD Acetate</b> .....	Merck Blue Label			.50	incl	¼ lb.	.20	incl
Earths and alkalies.....								
Copper.....								
Iron.....								
Aluminum.....								
Lead Carbonate and sub-								
stances insoluble in Water.....								
Chlorides.....								
Nitrates.....								
<b>LEAD Acetate</b> .....	Kahlbaum "C.f.A."					100 grm.	.90	incl

		Ounce and pound prices		Price in other size packages		
		per oz.	cont.	per lb.	cont.	
				size pkg.	per pkg.	cont.
				500 grm.	2.75	incl
LEAD	Acetate.....	Kahlbaum "C.F.A."				
	Nitrate.....	none				
	Carbonate.....	none				
	Chloride.....	slight trace				
	Alkalies and earths in residue.....	0.4 mg. in 10 grams				
LEAD	Acetate, c. p., basic, solution, for sugar analysis.....	Merck Blue Label		.25 gb	.15	
	Acetate, basic, solution, sp. gr. 1.24	Guaranteed		.40	incl	
	Copper.....	less than 0.0005%				
	Iron.....	less than 0.0002%				
	Copper.....	none				
LEAD	Acetate, c. p., basic, dry, for sugar analysis.....	Baker Analyzed		.50 cb	.06	
	Fe.....	0.001%				
	CaO.....	0.001%				
	Cl.....	0.001%				
	Na.....	trace				
LEAD	Acetate, c. p., tribasic.....	Baker Analyzed		.77	incl	
	Arsenate, c. p.....	.20	incl	2.00 cb	.06	
	Borate, c. p.....	.15	incl			
	Carbonate, purified.....	.60 cb	.09			
	Carbonate, c. p., basic.....	Baker Analyzed		.50 cb	.06	
LEAD	Chloride.....	Baker Analyzed		.50 cb	.06	
	Fe.....	0.001%				
	Cu.....	none				
	CaO.....	none				
	Na.....	trace				
LEAD	Chromate, c. p., powdered or fused	Baker Analyzed		.70 cb	.07	
	Fe.....	0.0003%				
	CaO.....	none				
	Cu.....	none				
	Na.....	trace				
LEAD	Chromate.....	Merck Blue Label		1.20	incl	
	Substances soluble in Water.....	not more than 0.02%				
	Organic substances.....	none				
	Iodide, c. p.....	3.50 cb	.07			
	Nitrate, pure, crystals.....	.21 cc	.06			
LEAD	Nitrate, c. p.....	Baker Analyzed		.25 cb	.06	
	Fe.....	0.0003%				
	CaO.....	0.001%				
	Cl.....	0.0002%				
	SO <sub>2</sub> .....	none				
LEAD	Oxalate, c. p.....	Baker Analyzed		.90 cb	.06	
	Oxide, brown (Lead Peroxide).....	.30 cc	.04			
	Oxide, brown (Peroxide), c. p.....	Baker Analyzed		.80 cb	.06	
	PbO <sub>2</sub> .....	93.6%				
	Mn.....	none				
LEAD	Oxide, brown, for ultimate analysis	Baker Special		1.25 cb	.06	
	Chlorides.....	not more than 0.001% as Cl				
	Calcium and alkalies.....	not more than 0.5%				
	Sulphates.....	less than 0.0005% as SO <sub>2</sub>				
	Nitrates.....	less than 0.0032% as NaO <sub>2</sub>				
LEAD	Oxide, brown, granulated, for use in elementary analysis	Merck Blue Label		.25	incl	
	Oxide (Orange Mineral) (Manganese free).....	.25 cb	.04			
	Chlorides.....	less than 0.001% as Cl				
	Sulphates.....	less than 0.0013% as SO <sub>2</sub>				
	Substances soluble in water (Lead Nitrate, etc.).....	less than 0.0375%				
LEAD	Oxide (Red Lead).....	Baker Analyzed		.18 cc	.06	
	Oxide (Red Lead), c. p.....	.20 cb	.04			
	Cl.....	0.003%				
	SO <sub>2</sub> .....	0.005%				
	C.....	trace				
LEAD	Oxide, yellow (Litharge).....	Baker Analyzed		.15 cc	.04	
	Oxide, yellow, (Litharge) c. p.....	.20 cb	.04			
	Al <sub>2</sub> O <sub>3</sub> .....	0.005%				
	CaO.....	0.005%				
	Cl.....	0.005%				
LEAD	Nitrate.....	none				
	Ag.....	none				

		Maker or Brand	Ounce and pound prices		Price in other size packages				
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
LEAD	Oxide, yellow.....	Merck Blue Label	.20	incl			1½ lb.	.50	incl
	Substances insoluble in								
	Acetic Acid.....	not more than 0.25%							
	Carbonates.....	not more than 0.1%							
	Copper.....	less than 0.001%							
	Iron.....	less than 0.002%							
	Aluminum.....	less than 0.1%							
	Nitrates and nitrites.....	less than 0.016% as $\text{N}_2\text{O}_5$							
	Chlorides.....	less than 0.002% as $\text{Cl}$							
	Earths, Gypsum, and								
	alkalies.....	not more than 0.3%							
LEAD	Oxide (Litharge).....	Kahlbaum "C.f.a."					100 grm.	.95	incl
"	Oxide (Litharge).....	Kahlbaum "C.f.a."					500 grm.	.20	incl
	Carbonate.....	none							
	Chloride.....	Trace							
	Residue present after precipitating								
	Lead (earths and alkalies).....	12 mg.							
	Alumina and Iron Oxide.....	none							
	Copper.....	none							
	Nitrates and nitrites.....	none							
	Solubility in Acetic Acid.....	complete							
LEAD	Phosphate, c. p.....	Baker Analyzed			1.35 cb	.07	¼ lb.	.40	incl
"	Sulphate, c. p.....	Baker Analyzed			.50 cb	.06			
	$\text{Cl}$ .....	—0.001%							
	$\text{Fe}$ .....	0.0003%							
	Acetate.....	none							
	Nitrate.....	none							
LEAD	Sulphide, c. p.....	Baker Analyzed			.50 cb	.06	¼ lb.	.20	incl
"	Tartrate, c. p.....	Baker Analyzed			1.50 cb	.07	¼ lb.	.45	incl
LECITHIN,	from eggs.....		1.40	incl			⅝ oz.	.25	incl
LEVULOSE (Diabotin).....		Schering			1.60	incl			
LIGROIN (See Ether Petroleum).									
LIME, Chlorinated, Cubes.....		Merck Blue Label			.35	incl			
	Active Chlorine, yields at least 25% by weight								
LIME WATER, tested reagent.....		Merck Blue Label			.40	incl			
LITHARGE (See Lead Oxide, Yellow).									
LITHIUM, metal, pure.....							1 grm.	1.50	incl
"	Acetate, c. p.....				1.75 cb	.09			
LITHIUM	Carbonate, c. p.....	Baker Analyzed			2.00 cb	.09	¼ lb.	.65	incl
	$\text{SO}_4$ .....	0.050%							
	$\text{Fe}$ .....	0.0002%							
	$\text{Al}_2\text{O}_3$ .....	0.001%							
LITHIUM	Chloride, c. p.....	Baker Analyzed	.25	incl	2.50 cb	.03	¼ lb.	.75	incl
	$\text{SO}_4$ .....	0.080%							
	$\text{Fe}$ .....	0.0002%							
	$\text{Al}_2\text{O}_3$ .....	0.0005%							
LITHIUM	Citrate, c. p.....	Baker Analyzed			2.50 cb	.08	¼ lb.	.75	incl
"	Nitrate, c. p.....	Baker Analyzed	.25	incl	2.50 cb	.08	¼ lb.	.75	incl
	$\text{SO}_4$ .....	0.050%							
	$\text{Fe}$ .....	0.0002%							
	$\text{Al}_2\text{O}_3$ .....	0.001%							
	$\text{Cl}$ .....	0.015%							
LITHIUM	Sulphate, c. p.....		.25	incl	2.25 cb	.08	¼ lb.	.70	incl
LITHIUM,	cubes.....				.25 cc	.04			
"	powder.....				.40 cc	.04			
LITMUS	.....	Merck Blue Label	.40	incl			¼ lb.	1.25	incl
	Tested for Sensitiveness								
LITMUS,	Paper (See Test Paper).								
"	Pencils, each with one red and one blue point.....						each	.20	
"	Solution (Indicator).....				.60 cb	.08			
LITMUS	Solution, according to Kubel and Tiemann in original packages.....	Kahlbaum					500 grm.	1.80	incl
"	Solution, according to Kubel and Tiemann in original packages.....	Kahlbaum					1 kilo	3.50	incl
"	Milk (Lakmusmolke künstlich nach Seitz).....	Kahlbaum					100 grm.	.25	incl
"	Milk (Lakmusmolke künstlich nach Seitz).....	Kahlbaum					500 grm.	.75	incl
LOGWOOD Extract	.....				.30	incl			
LYCOPODIUM	.....		.10 cb	.03	1.20 cb	.08			
LYSOL	.....	Lehn & Fink			.75 cb	.08	1 gal.	5.00	incl
MAGNESITE	.....	Merck Blue Label			.40	incl	¼ lb.	.20	incl
	Loss on ignition.....	about 50%							
°MAGNESIUM,	metal, powder.....		.25	incl	2.60	incl			
"	metal, ribbon.....		.45	incl					
"	metal, rods.....		.30	incl					
"	metal, wire.....		.45	incl					
MAGNESIUM	Acetate, c. p.....	Baker Analyzed			.90 cb	.10	¼ lb.	.35	incl
"	Aluminum Sulphate, c. p.....				.65 cb	.09	¼ lb.	.25	incl

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
MAGNESIUM	Ammonium Chloride, c. p.	Baker Analyzed			.35	cb .08	¼ lb.	.15	incl
	Fe.....	0.0003%	} Typical Analysis						
	CaO.....	0.001%							
	P.....	none							
	SO <sub>2</sub> .....	0.001%							
MAGNESIUM	Ammonium Chloride.....	Merck Blue Label			.80	incl	¼ lb.	.30	incl
	Sulphates.....	less than 0.01% as SO <sub>2</sub>	} Guaranteed Analysis						
	Heavy metals.....	none							
	Calcium.....	less than 0.005%							
	Barium.....	less than 0.002%							
	Phosphates.....	less than 0.001% as P <sub>2</sub> O <sub>5</sub>							
	Arsenates.....	less than 0.005% as As <sub>2</sub> O <sub>3</sub>							
MAGNESIUM	Ammonium Phosphate, c. p.	Baker Analyzed			1.00	cb .08	¼ lb.	.35	incl
"	Ammonium Sulphate, c. p.	Baker Analyzed			.35	cb .08	¼ lb.	.15	incl
"	Borate, c. p.				.15	incl			
"	Bromide, c. p.				.25	incl			
"	Carbonate, pure, powder.....				.25	cc .05			
"	Carbonate, c. p., basic.....	Baker Analyzed			.90	cb .10	¼ lb.	.35	incl
	Fe.....	0.001%	} Typical Analysis						
	Cl.....	0.03%							
	SO <sub>2</sub> .....	0.001%							
	CaO.....	none							
	Al <sub>2</sub> O <sub>3</sub> .....	0.0002%							
	Nitrate.....	trace							
MAGNESIUM	Carbonate.....	Merck Blue Label			.50	incl	¼ lb.	.20	incl
	Substances soluble in Water.....	not more than 0.75%	} Guaranteed Analysis						
	Sulphates.....	less than 0.012% as SO <sub>2</sub>							
	Substances insoluble in Hydrochloric Acid.....	none							
	Chlorides.....	less than 0.002% as Cl							
	Barium.....	less than 0.015%							
	Calcium.....	less than 0.06%							
	Aluminum.....	less than 0.6%							
	Heavy metals.....	none							
	Iron.....	less than 0.015%							
MAGNESIUM	Chloride, pure, crystals.....				.25	cb .10			
"	Chloride, c. p., crystals.....	Baker Analyzed			.30	cb .09	¼ lb.	.17	incl
	NH <sub>3</sub> .....		} Typical Analysis						
	Fe.....	0.0003%							
	CaO.....	0.003%							
	SO <sub>2</sub> .....	0.001%							
MAGNESIUM	Chloride, crystals.....	Merck Blue Label			1.00	incl	¼ lb.	.35	incl
	Substances insoluble in Alcohol.....	none	} Guaranteed Analysis						
	Sulphates.....	less than 0.01% as SO <sub>2</sub>							
	Phosphates.....	less than 0.0016% as P <sub>2</sub> O <sub>5</sub>							
	Arsenates.....	less than 0.03% as As <sub>2</sub> O <sub>3</sub>							
	Ammonium salts.....	less than 0.001% as NH <sub>3</sub>							
	Barium.....	less than 0.002%							
	Heavy metals.....	none							
	Calcium.....	less than 0.005%							
MAGNESIUM	Chloride, crystals.....	Kahlbaum "C.f.A."					100 grm.	.65	incl
"	Chloride, crystals.....	Kahlbaum "C.f.A."					500 grm.	1.60	incl
	Calcium Oxide and Baryta.....	none	} In 10 grams } Certified Analysis						
	Heavy metals.....	none							
	Ammonium salts.....	none							
	Sulphate.....	none							
	Phosphate.....	none							
	Arsenate.....	none							
MAGNESIUM	Chloride, c. p., fused, lump (Ammonia free).....				.70	cb .08	¼ lb.	.25	incl
"	Chloride, c. p., sticks (Ammonia free).....				.80	cb .08	¼ lb.	.25	incl
"	Nitrate, c. p.	Baker Analyzed			.10	incl .50	cb .09	¼ lb.	.20
"	Nitrate, c. p., fused.....				.15	incl .90	cb .09	¼ lb.	.35
"	Oxalate, c. p.	Baker Analyzed			1.25	cb .09	¼ lb.	.40	incl
"	Oxide, light, powder.....				.60	incl			
"	Oxide, heavy, powder.....				.65	incl			
"	Oxide, c. p.	Baker Analyzed			1.00	cb .12	¼ lb.	.35	incl
	Fe.....	0.007%	} Typical Analysis						
	Cl.....	0.20%							
	SO <sub>2</sub> .....	0.015%							
	Al <sub>2</sub> O <sub>3</sub> .....	0.02%							
	CO <sub>2</sub> .....	1.3%							
MAGNESIUM	Oxide.....	Merck Blue Label			1.00	incl	¼ lb.	.35	incl
	Substances soluble in water.....	not more than 0.75%	} Guaranteed Analysis						
	Substances insoluble in Hydrochloric Acid.....	none							
	Sulphates.....	less than 0.375% as SO <sub>2</sub>							
	Chlorides.....	less than 0.04% as Cl							
	Carbonates.....	less than 4% as CO <sub>2</sub>							
	Nitrogen.....	not more than 0.0036%							
	Barium.....	less than 0.02%							
	Calcium.....	less than 0.01%							
	Heavy metals.....	none							
	Iron.....	less than 0.025%							
MAGNESIUM	Oxide, c. p.	Baker Special			1.50	cb .12	¼ lb.	.45	incl
	CaO.....	0.10%	} Typical Analysis						
	Fe.....	0.002%							
	Cl.....	0.250%							
	SO <sub>2</sub> .....	0.010%							



		Ounce and pound prices				Price in other size packages	
		Maker or Brand		per oz.	cont.	per lb.	cont.
				per oz.	cont.	size pkg.	per pkg.
MAGNESIUM	Oxide, free from Sulphates	Merck Blue Label		.30	incl	14 lb.	.90 incl
	Substances soluble in Water.....	not more than 0.75%	Guaranteed Analysis				
	Substances insoluble in Hydrochloric Acid.....	none					
	Chlorides.....	less than 0.01% as Cl					
	Carbonates.....	less than 4% CO <sub>2</sub>					
	.....	not more than 0.0036%					
	.....	less than 0.02%					
	Heavy metals.....	none					
	Iron.....	less than 0.025%					
	Sulphates.....	less than 0.016% as SO <sub>3</sub>					
MAGNESIUM	Oxide and Sodium Carbonate, c. p. (Eschka's Mixture).....	Baker Analyzed		1.00	cb .10	1/4 lb.	.35 incl
	MgO.....	66.2-72%	Typical Analysis				
	Na <sub>2</sub> CO <sub>3</sub> .....	29.1					
	Loss.....	0.0-4.0					
	.....	0.002-0.005					
	Cl.....	0.340%					
MAGNESIUM	Phosphate, c. p. (tribasic).....	Baker Analyzed		.85	cb .08	1/4 lb.	.30 incl
"	Pyrophosphate, c. p. ....			1.75	cb .08		
"	Sulphate, pure, crystals.....						
"	.....	.....					
MAGNESIUM	Sulphate, c. p. ....	Baker Analyzed		.20	cb .08		
	Cl.....	0.001%	Typical Analysis				
	.....	0.001%					
	.....	0.1-1.0					
MAGNESIUM	Sulphate.....	Merck Blue Label		.50	incl	1/4 lb.	.20 incl
	Chlorides.....	less than 0.030% as Cl	Guaranteed Analysis				
	.....	less than 0.0016% as PO <sub>4</sub>					
	.....	less than 0.05% as As <sub>2</sub> O <sub>3</sub>					
	.....	none					
	.....	less than 0.0005%					
	.....	less than 0.0015%					
MAGNESIUM	Sulphate.....	Kahlbaum "C.f.a."				500 grm.	.85 incl
	.....	.....	In 10 grams Certified Analysis				
	.....	.....					
	.....	.....					
	.....	.....					
	.....	.....					
	Sodium (flame reaction).....	none					
MAGNESIUM	Sulphate, c. p., anhydrous.....	Baker Analyzed		.45	cb .08	1/4 lb.	.20 incl
"	Tartrate, c. p. ....			2.00	cb .08	1/4 lb.	.65 incl
MALTINE	Dist. of Malt.....			.65	cb .03		
MALTOSE.....				.60	cb .03		
"		Kahlbaum.....				10 grm.	.40 incl
MANGANESE,	metal, coml., 94%.....			.20	cb .03		
"	pure fused.....			.30	cb .03		
"	Acetate, c. p. ....	Baker Analyzed		1.00	cb .08	1/4 lb.	.35 incl
"	Borate, c. p. ....			.85	cb .10		
MANGANESE	Carbonate, c. p. ....	Baker Analyzed		.70	cb .10	1/4 lb.	.24 incl
	Al <sub>2</sub> O <sub>3</sub> .....	0.002%	Typical Analysis				
	.....	.....					
	.....	trace					
MANGANESE	Chloride, c. p. ....	Baker Analyzed		.40	cb .08	1/4 lb.	.20 incl
	Fe.....	0.001%	Typical Analysis				
	.....	.....					
	.....	.....					
MANGANESE	Chloride.....	Merck Blue Label		.50	incl	1/4 lb.	.20 incl
	Sulphates.....	less than 0.01% as SO <sub>3</sub>	Guaranteed Analysis				
	Chlorides.....	less than 0.0023% as Cl					
	Calcium.....	less than 0.03%					
	Iron.....	less than 0.0005%					
	Other foreign metals.....	none					
	Salts of Magnesium and the alkalies.....	not more than 0.033%					
	Zinc.....	less than 0.2%					
MANGANESE	Chloride.....	Kahlbaum "C.f.a."				100 grm.	.50 incl
	.....	.....	In 10 grams Certified Analysis				
	.....	.....					
	.....	.....					
	.....	.....					
	.....	.....					
	Iron.....	trace					
	Other heavy metals.....	none					
	Alkalies present after precipitating.....	.....					
	Manganese.....	3.2 mg.					
MANGANESE	Dioxide, native, granular.....			10	cc .04		
"	Dioxide, native, powder.....			.10	cc .04		
"	Dioxide, c. p. (Carbon free).....	Baker Analyzed		.75	cb .06	1/4 lb.	.25 incl
"	Dioxide, tested reagent.....	Merck Blue Label		.50	incl	1/4 lb.	.20 incl
"	Metaphosphate, solution, tested reagent.....	Merck Blue Label		1.25	incl	1/4 lb.	.40 incl
"	Nitrate, c. p. ....	Baker Analyzed		1.25	gb .15	1/4 lb.	.40 incl

## A R T H U R H. T H O M A S C O M P A N Y

			Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
MANGANESE Oxide, c. p., hydrated.....			Baker Analyzed		.50	cb .08	¼ lb.	.20	incl
" Oxide, c. p., brown.....					1.00	cb .08	¼ lb.	.35	incl
" Phosphate, c. p.....			Baker Analyzed		2.00	cb .10	¼ lb.	.65	incl
" Sulphate, pure, crystals.....					.38	cb .09			
" Sulphate, c. p.....			Baker Analyzed		.45	cb .07	¼ lb.	.20	incl
Fe..... 0.002%									
Cl..... 0.003%									
CaO..... 0.030%									
Na..... trace									
MANGANESE Sulphate.....			Merck Blue Label		.60	incl	¼ lb.	.25	incl
Chlorides..... less than 0.002% as Cl.									
Substances reducing Potassium Permanganate..... at most a trace									
Iron..... less than 0.0008%									
Zinc..... less than 0.2%									
Other foreign metals..... none									
Salts of Magnesium and the alkalies..... not more than 0.033%									
Calcium..... less than 0.03%									
MANGANESE Sulphate.....			Kahlbaum "C.f.A."				100 grm.	.60	incl
" Sulphate.....			Kahlbaum "C.f.A."				500 grm.	1.15	incl
Lime..... none									
Zinc..... none									
Iron..... none									
Other metals..... none									
Chloride..... trace									
Alkaline residue present after precipitating Manganese..... 4.4 mg.									
MANGANESE Sulphide, c. p.....					2.50	cb .08	¼ lb.	.75	incl
MANGANESE Tartrate, c. p.....			Baker Analyzed		2.80	cb .08	¼ lb.	.80	incl
MANNITE.....			.30	cc .04	3.25	incl			
MANNOSE.....							10 grm.	3.00	incl
MARBLE LUMPS (See Calcium Carbonate.....)									
MELETOSE (See Raffinose).....									
MERCURY.....					.80	hg .05			
" redistilled.....					.90	hg .05			
Foreign metals..... none									
MERCURY Acetate, c. p. (ic).....			.25	incl	2.50	gb .08	¼ lb.	.75	incl
" Acetate, c. p. (ous).....			.30	incl					
" Bichloride, crystals (Corrosive Sublimate).....					.90	cc .04			
" Bichloride, powder (Corrosive Sublimate).....					.90	cc .04			
" Bichloride, crystals, c. p.....			Baker Analyzed		.20	incl	1.75	cb .06	¼ lb. .60 incl
Fe..... 0.0005%									
SO <sub>2</sub> ..... 0.001%									
Mercurous Salt..... trace									
Nonvolatile matter..... 0.004%									
MERCURY Bichloride.....			Merck Blue Label		.25	incl	½ lb.	1.20	incl
Foreign metals not precipitated by Hydrogen Sulphide..... less than 0.01%									
Arsenic..... less than 0.0008%									
Mercurous Chloride and other substances insoluble in Ether..... none									
MERCURY Bichloride.....			Kahlbaum "C.f.A."				100 grm.	1.10	incl
" Bichloride.....			Kahlbaum "C.f.A."				500 grm.	3.60	incl
Insoluble in Ether..... trace									
Arsenic..... none									
Foreign substances..... unweighable									
MERCURY Bromide, c. p.....			.35	incl					
" Chloride, powder (ous).....					.95	cb .06			
" Chloride, c. p. (ous).....			Baker Analyzed		.20	incl	1.75	cb .06	¼ lb. .60 incl
Nonvolatile matter..... 0.0005%									
Fe..... 0.0002%									
Mercuric Salt..... trace									
MERCURY Iodide, c. p., red (ic).....			.30	incl					
" Iodide, (ous).....			.30	incl					
" Nitrate, c. p. (ic).....			Baker Analyzed		.15	incl	1.50	gb .12	¼ lb. .45 incl
Nonvolatile matter..... 0.003%									
Fe..... 0.0004%									
Pb..... none									
Sn..... none									
Cl..... 0.0001%									
MERCURY Nitrate, c. p. (ous).....			Baker Analyzed		.15	incl	1.50	gb .12	¼ lb. .45 incl
Nonvolatile matter..... 0.003%									
Mercuric Salt..... trace									
Fe..... 0.0001%									
MERCURY Nitrate (ous).....			Merck Blue Label		.30	incl	½ lb.	1.50	incl
Nonvolatile matter..... less than 0.025%									
Mercuric salts..... at most a trace									

		Ounce and pound prices				Price in other size packages		
		Maker or Brand	per oz.	cont.	per lb.	cont.	size pkg.	per pkg.
MERCURY	Oxide, c. p., red (ic).....	Baker Analyzed	.20	incl	1.70	cb .06	¼ lb.	.60 incl
	Nonvolatile matter..... 0.008%							
	Fe..... 0.002%							
	Nitrates..... trace	Typical Analysis						
	Pb..... none							
	Cl..... 0.001%							
	SO <sub>4</sub> ..... 0.001%							
MERCURY	Oxide, red (ic).....	Merck Blue Label	.25	incl			½ lb.	1.20 incl
	Nonvolatile matter..... less than 0.025%							
	Chlorides..... less than 0.002% as Cl	Guaranteed Analysis						
	Sulphates..... less than 0.175% as SO <sub>4</sub>							
	Nitrates..... less than 0.016% as N <sub>2</sub> O <sub>5</sub>							
MERCURY	Oxide, c. p., yellow, (ic) Hydrated.....	Baker Analyzed	.20	incl	2.00	cb .16	¼ lb.	.65 incl
	Nonvolatile matter..... 0.010%							
	Nitrates..... none	Typical Analysis						
	Cl..... trace							
	SO <sub>4</sub> ..... 0.250%							
MERCURY	Oxide, yellow (ic).....	Merck Blue Label	.25	incl			½ lb.	1.40 incl
	Nonvolatile matter..... less than 0.025%							
	Chlorides..... less than 0.002% as Cl	Guaranteed Analysis						
	Sulphates..... less than 0.175% as SO <sub>4</sub>							
	Nitrates..... less than 0.016% as N <sub>2</sub> O <sub>5</sub>							
MERCURY	Oxide, precipitated (ic).....	Kahlbaum "C.f.a.".....					100 grm.	1.15 incl
"	Oxide, precipitated (ic).....	Kahlbaum "C.f.a.".....					500 grm.	3.70 incl
	Nonvolatile matter..... unweighable							
	Nitric Acid..... none	In 10 grams { Certified Analysis						
	Chlorides..... none							
	Sulphuric Acid..... none							
	Iron..... none							
MERCURY	Oxide, c. p., (ous).....				2.00	cb .07	¼ lb.	.65 incl
MERCURY	Potassium Iodide.....	Merck Blue Label	.65	incl			¼ oz.	.25 incl
"	Tested for..... Solubility							
"	Sulphate, c. p. (ic).....	Baker Analyzed			1.75	cb .06	¼ lb.	.60 incl
"	Sulphate, c. p. (ous).....	Baker Analyzed			2.00	cb .06	¼ lb.	.65 incl
"	Sulphide, c. p. (ic).....	Baker Analyzed			1.50	cb .06	¼ lb.	.45 incl
MERCURY	Thiocyanate, c. p. (ic).....	Baker Analyzed	.25	incl	2.50	cb .07	¼ lb.	.75 incl
METAL	Devarda's Alloy, for reductions.....	Baker Analyzed			1.50	incl	¼ lb.	.45 incl
	Copper..... 50%	Typical Analysis						
	Aluminum..... 45%							
	Zinc..... 5%							
METAL	Devarda's Alloy.....	Merck Blue Label	.35	incl			¼ lb.	1.00 incl
	Nitrogen..... not more than 0.0056%							
METAL	Rose's Alloy, fusible.....	Baker Analyzed	.30	incl	3.00	incl	¼ lb.	.95 incl
	Bismuth..... 2 parts	Typical Analysis						
	Lead..... 1 part							
	Tin..... 1 part							
	M. P..... 93.75°C							
METAL	Wood's Alloy, fusible.....	Baker Analyzed	.30	incl	3.00	incl	¼ lb.	.95 incl
	Bismuth..... 4 parts	Typical Analysis						
	Lead..... 2 parts							
	Tin..... 1 part							
	Cadmium..... 1 part							
	M. P..... 60.2°C							
METAPHENYLENEDIAMINE	pure crystals.....		.85	cb .03				
METAPHENYLENEDIAMINE HYDRO-CHLORIDE	.....	Merck Blue Label	1.00	incl			¼ oz.	.30 incl
	Inorganic impurities..... less than 0.05%							
METHYL	Acetate, c. p. ....	Baker Analyzed	.30	incl				
"	Iodide.....		.65	gb .05				
"	Orange, true indicator.....		.50	incl				
"	Orange, indicator.....	Merck Blue Label	.50	incl			¼ oz.	.20 incl
	Tested for Sensitiveness.....							
METHYL	Red, indicator.....	Merck Blue Label					⅜ oz.	1.25 incl
"	Red, indicator.....	Merck Blue Label					15 grn.	.50 incl
	Tested for Sensitiveness.....							
METHYLENE	Iodide.....		1.25	gb .05				
METOL	Hauffs.....		.65	incl				
MICROCOSMIC SALT	(See Sodium Ammonium Phosphate).....							
M LK SUGAR	(See Lactose).....							
MOLYBDENUM	metal powder. 95%.....		.40	cb .03				
"	Wire, No. 28 B & S gauge						Per foot	.30 incl
"	Oxide, pure (mono).....		1.00	cb .03			¼ lb.	1.50 incl
NAHRSTOFF	Heydens, in original tins.....				.10	ce .04		
NAPHTHALENE	white, sublimed, flakes.....				.75	cb .09		
NAPHTHALENE	c. p., purified by Alcohol	Baker Analyzed			.6	cb .08		
NAPHTHOL	(alpha).....		.20	cb .04	2.00	cb .08		
"	(alpha) recrystallized.....		.10	cb .03	.50	cb .08		
"	(beta) resublimed.....							
"	Nitroso-beta.....		1.90	incl				

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
NAPHTHYLAMINE (alpha), pure.....		.30	cb .04					
“ (beta), pure.....		.40	cb .03					
“ Chloride (alpha), pure.....		.30	cb .03					
“ Chloride (beta), pure.....		.25	cb .03					
NESSLER'S TEST SOLUTION.....		.15	incl	1.10	incl			
NICKEL, metal, 98-99%, cubes or granular.....				1.10	cc .04			
“ metal, pure, sheet such as used for making boats for the direct combustion of iron and steel, No. 26 B & S gauge.....		.20	incl	2.00	incl			
“ metal, wire.....		.30	incl	3.00	incl			
“ metal, pure.....		.75	incl					
“ metal, c. p. (Cobalt free).....		2.00	incl					
“ metal, for anodes, cast in following sizes: 200 x 100 x 4 mm. and 200 x 100 x 5 mm.....				1.00	incl			
“ metal, for anodes, forged, 200 x 100 x 2 mm.....				1.00	incl			
NICKEL Acetate, c. p.....	Baker Analyzed	.20	incl	1.60	cb .08	¼ lb.	.60	incl
“ Ammonium Sulphate, pure crystals.....				.20	cc .04			
“ Ammonium Sulphate, c. p.....	Baker Analyzed			.75	cb .08	¼ lb.	.25	incl
“ Carbonate, c. p.....	Baker Analyzed	.25	incl	2.50	cb .10	¼ lb.	.75	incl
“ Chloride, pure crystals.....				.75	cb .08			
NICKEL Chloride, c. p.....	Baker Analyzed			1.50	cb .08	¼ lb.	.45	incl
Fe..... 0.001%	Typical Analysis							
Cu..... none								
Co..... 0.02%								
SO <sub>4</sub> ..... none								
NICKEL Chloride, c. p. (Cobalt free).....	Baker Special	.30	incl					
“ Nitrate, c. p.....	Baker Analyzed	.15	incl	.90	cb .08	¼ lb.	.35	incl
“ Nitrate, c. p., (Cobalt free).....	Baker Special	.30	incl					
“ Oxide, c. p., green.....	Baker Analyzed			1.50	cb .09	¼ lb.	.45	incl
Fe..... 0.002%	Typical Analysis							
Cu..... trace								
Co..... none								
SO <sub>4</sub> ..... 0.150%								
NICKEL Oxide, black, pure.....		.20	cb .03	1.25	cb .08			
“ Sulphate, pure, crystals.....				.26	cb .09			
“ Sulphate, c. p.....	Baker Analyzed			1.50	cb .08	¼ lb.	.45	incl
Fe..... 0.0005%	Typical Analysis							
Cu..... none								
Co..... 0.005%								
Cl..... 0.001%								
NICKEL Sulphate, c. p. (Cobalt free).....	Baker Special	.40	incl					
NINHYDRIN.....						16 grm.	.25	incl
NITROBENZALDEHYDE, Ortho, tested reagent.....	Merck Blue Label					¼ oz.	.75	incl
“ Ortho, tested reagent.....	Merck Blue Label					15 grn.	.25	incl
NITROBENZENE, (solvent).....	Baker Analyzed			.30	cb .08			
NITROBENZOL, twice rectified, (Oil of Mirbane).....				.25	cb .08			
NITRON, tested reagent.....	Merck Blue Label	4.00	incl			½ oz.	.60	incl
NITROPHENOL, Ortho, tested reagent..	Merck Blue Label	.55	incl			¼ oz.	.20	incl
“ Para, tested reagent.....	Merck Blue Label	.55	incl			¼ oz.	.20	incl
NITROSOBETANAPHTHOL.....	Merck Blue Label	1.00	incl			¼ oz.	.30	incl
“ tested reagent.....	Merck Blue Label	1.00	incl			¼ oz.	.30	incl
NORMAL SOLUTIONS (See Solutions)...								
NUTROSE (Casein-Sodium) in original package.....						¼ lb.	1.00	incl
OIL, Aniline (See Aniline).....								
“ Bergamot, hand pressed.....		.60	incl	7.50	cb .08			
“ Cajeput, rectified.....				1.25	cb .08			
“ Cedar, for use as a clearing agent in microscopy.....				.90	cb .08			
“ Cedar, Special, for use as clearing agent in microscopy, guaranteed to mix with alcohol in all proportions without cloudiness.....				1.50	cb .08			
“ Cedar, Special for Immersion Objectives.....		.25	cb .03	3.00	cb .08			
“ Cedar, Special for Immersion Objectives.....	Zeiss.....					½ oz.	.30	incl
“ Cloves, twice rectified.....		.25	cb .03	2.75	cb .08			



	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
OIL, Cottonseed.....				.15	cb .08			
° " Linseed, raw.....				.20	cb .08			
" Linseed, boiled.....				.20	cb .08			
" Mirbane (See Nitrobenzole).....								
" Olive, Laven's Cream.....				.60	cb .08	1 gal.	3.50	incl
" Origanum, Crested.....				30	cb .03	4.00	cb .08	
" Paraffine, white, pure.....				.20	cb .08			
" Sperm.....				.20	cb .08			
" Turpentine (See Turpentine).....								
ORCIN, pure crystals.....						1 grm.	.15	incl
ORPIMENT, (See Arsenic Sulphide).....								
ORTOL.....				.75	incl			
OXGALL, neutral, freshly precipitated for bacteriological use.....						½ lb.	2.25	incl
° "OXONE," for generating Oxygen.....						2 lb.	1.50	incl
° OXYGEN, gas, 99% pure, as used in calorimetry, carbon combustions in steel, etc. Guaranteed to be free from the Oxides of Carbon, Hydrocarbons, Chlorine and other deleterious substances. Furnished in seamless steel cylinders. Made in accordance with the requirements of the Interstate Commerce Commission. The price includes one cylinder, containing 70 cu. ft. at 1800 lbs. pressure at 68° F. These cylinders are returnable for refilling only.....						17.80		incl
° OXYGEN, gas, 97% <sub>2</sub> , at 1000 lbs. pressure.....						40 gal.	2.25 cyl.	6.00
" gas, 97% <sub>2</sub> , at 1000 lbs. pressure.....						100 gal.	5.00 cyl.	12.00
" These cylinders returnable for credit or refilling.....								1.75
OZOKERITE, black.....				.25	incl			
PALLADIUM, sheets or wire.....	Merck Blue Label					1 gr.	.30	incl
" Copper and Iron.....none								
PALLADIUM, black.....	Merck Blue Label					5 gr.	1.50	incl
" black.....	Merck Blue Label					15 gr.	4.25	incl
" Copper and Iron.....none								
PALLADIUM Chloride, tested reagent.....	Merck Blue Label					5 gr.	1.10	incl
" Chloride, tested reagent.....	Merck Blue Label					15 gr.	3.00	incl
° " Nitrate, tested reagent.....	Merck Blue Label					5 gr.	.85	incl
° " Nitrate, tested reagent.....	Merck Blue Label					15 gr.	2.25	incl
" Sodium Chloride, tested reagent.....	Merck Blue Label					5 gr.	.65	incl
" Sodium Chloride, tested reagent.....	Merck Blue Label					15 gr.	1.75	incl
PALM OIL Soap.....						cake	.10	incl
PANCREATIN, active.....				.60	incl			
PAPER, (See Test Paper).....								
PARAFFINE, domestic, melting point about 13°C.....				.15	incl			
" domestic, melting point about 52°C.....				.15	incl			
(For imported Paraffine melting at other temperatures, see Imbedding Media.)								
PARA-AMIDO-ACETOPHENON.....				1.50	cb .03			
PARA-DIMETHYL-AMIDO-BENZALDEHYDE for Ehrlich's test.....						10 grm.	1.00	incl
PARA-PHENYLENEDIAMINE, pure cryst. Hydrochloride.....				.80	cb .04			
" Hydrochloride.....				1.00	cb .05			
° PARALDEHYDE.....				.75	cb .09			
PARCHMENT Paper, thin.....				.40	incl			
" Paper, medium.....				.40	incl			
" Paper, heavy.....				.40	incl			

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>PARCHMENT Paper</b> , for dialyzing, No. 0, sheet 26 x 39 in., as used in the manufacture of biological products such as Antitoxin, etc., and not to be confused with the parchment paper of commerce.						sheet	.30	incl
<b>PEPSIN</b> , powder or scales, U. S. P.		.35	cb .04					
<b>PEPTONE</b> , for preparation of culture media.	Witte	.30	cb .03	3.25	cb .09			
“ for preparation of culture media, in original tins of 10 kilos.	Witte						67.50	incl
“ from meat, dry.		.25	cb .04					
“ Silk (Seiden peptone), for Abderhalden Test.						1 grm.	.50	incl
“ Silk (Seiden peptone), for Abderhalden Test.						5 grm.	2.00	incl
“ Silk (Seiden peptone), for Abderhalden Test.						10 grm.	3.75	incl
“ Placenta, for Abderhalden Test.						1 grm.	5.50	incl
<b>PETROLATUM</b> , white.				.25	incl	5 lb.	1.10	incl
“ yellow.				.15	incl	5 lb.	.50	incl
<b>PETROLEUM, Ether</b> (See Ether).								
<b>PHENACETOLIN, Indicator</b>	Merck Blue Label					½ oz.	.25	incl
“ Indicator	Merck Blue Label					½ oz.	.75	incl
Tested for.....Sensitiveness								
<b>PHENOL</b> (See Acid Carbolio).								
<b>PHENOLPHTHALEIN</b> , pure.		.25	cb incl	2.00	cb incl			
<b>PHENOLPHTHALEIN</b> .	Merck Blue Label	.35	incl			¼ lb.	1.25	incl
Tested for.....Proper solubility in Alcohol								
Tested for.....Sensitiveness	Guaranteed Analysis							
Nonvolatile matter.....less than 0.1%								
Fluorane.....none								
<b>PHENYLHYDRAZINE</b> .		.25	gb .07	2.75	gb .11			
<b>PHENYLHYDRAZINE</b> .	Merck Blue Label	.55	incl			¼ oz.	.25	incl
Tested for.....Proper solubility								
<b>PHENYLHYDRAZINE HYDROCHLORIDE</b>		.35	gb .07					
<b>PHENOLSULPHONEPHTHALEIN</b> , in original box of 10 ampoules.							1.00	incl
<b>PHLOROGLUCIN</b> , for Günsburg's reagent.		4.00	incl			15 gr.	.25	incl
<b>PHLOROGLUCIN</b> .	Merck Blue Label					½ oz.	1.25	incl
“	Merck Blue Label					15 gr.	.25	incl
“ Disorecin.....none								
<b>PHOSPHORUS</b> , red, amorphous.		.15	cb .04	1.20	cb .09			
“ yellow, sticks.		.15	cn .01	.90	incl	¼ lb.	.30	incl
“ yellow, sticks, ⅛" for gas analysis.		.20	incl	2.00	incl	¼ lb.	.65	incl
“ Oxychloride.		.20	incl	2.00	gb .15	¼ lb.	.75	incl
“ Pentachloride.		.15	incl	1.50	gb .15	¼ lb.	.45	incl
“ Trichloride.		.15	incl	1.50	gb .15	¼ lb.	.45	incl
“						pkge	.10	incl
<b>PITH</b> , for imbedding.								
<b>PLASTER PARIS</b> (See Calcium Sulphate)					.10	cc .04		
<b>PLATINUM</b> , metal, foil or wire (Prices on application).								
<b>PLATINUM</b> , metal, sheets or wire.	Merck Blue Label					1 gr.	.28	incl
Foreign metals.....at most a trace	Guaranteed Analysis							
Silver.....none								
<b>PLATINUM</b> , black.	Merck Blue Label					5 gr.	1.50	incl
Foreign metals.....at most a trace	Guaranteed Analysis							
Silver.....none								
<b>PLATINUM</b> , Sponges, set in rings.						each	.80	incl
“ Asbestos, 5%.		4.50	incl					
“ Chloride (ic).		22.50	cb .04					
“ Chloride, c. p., solution 5%.		2.00	incl					
“ Chloride, c. p., solution 10%.		3.25	incl					
<b>PLATINUM</b> Chloride.	Merck Blue Label					½ oz.	5.00	incl
“ Chloride.	Merck Blue Label					15 gr.	1.75	incl
Tested for.....Solubility in Absolute Alcohol								
Metals soluble in Nitric Acid.....not more than 0.25%	Guaranteed Analysis							
Sulphates.....less than 0.0075% as SO <sub>3</sub>								
Nitrates.....less than 0.08% as N <sub>2</sub> O <sub>4</sub>								
Barium Salts.....less than 0.002% as Ba								
<b>PLATINUM Crucibles, Dishes</b> (See Apparatus catalogue).								

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
PLATINUM Potassium Chloride (ic) (Potassium Chloroplatinate).....						15 gr.	1.40	incl.
" Potassium Chloride (ous) (Potassium Chloroplatinite).....		28.50				15 gr.	1.45	incl.
It is recommended that quotations on Platinum and Platinum salts be secured in advance on account of market fluctuations in price.								
POIRRIER'S BLUE, C.B. indicator.....	Merck Blue Label	1.25	incl.			¼ oz.	.40	incl.
Tested for.....Sensitivity								
*POTASSIUM, metal, balls.....		1.25	gb.	.10	15.00	gb.	.18	¼ oz. .35 gb .08
" Acetate, purified, granular, grade recommended for preparation of Kaiserling solution.....								
POTASSIUM Acetate, c. p.....	Baker Analyzed					.35 cb	.08	¼ lb. .24 incl.
Fe.....0.004%						.65 cb	.09	
Cl.....0.0005%	Typical Analysis							
Na.....trace								
CaO.....none								
SO <sub>4</sub> .....0.001%								
POTASSIUM Acetate, c. p., anhydrous.....	Baker Special	.15	incl.	.90	gb.	.09	¼ lb. .35	incl.
POTASSIUM Acetate Solution, about 33% sulphates.....less than 0.01% as SO <sub>4</sub>	Merck Blue Label			.50	incl.		¼ lb. .20	incl.
Heavy metals.....none	Guaranteed Analysis							
Iron.....less than 0.0015%								
Calcium.....less than 0.002%								
POTASSIUM Ammonium Sulphate, c. p.....	Baker Analyzed			.45	cb	.08	¼ lb. .20	incl.
" Antimonate, c. p.....				1.30	cb	.07	¼ lb. .40	incl.
" Antimonate.....	Merck Blue Label	.20	incl.				¼ lb. 1.10	incl.
Tested for.....Suitability as a reagent for Sodium								
POTASSIUM Arsenate, c. p.....	Baker Analyzed			.80	cb	.07	¼ lb. .30	incl.
Fe.....0.001%	Typical Analysis							
Cl.....								
Na.....								
CaO.....								
POTASSIUM Arsenite, c. p.....	Baker Analyzed			.80	cb	.07	¼ lb. .30	incl.
Fe.....	Typical Analysis							
Cl.....								
Na.....								
CaO.....								
POTASSIUM Bicarbonate, c. p.....	Baker Analyzed			.35	cb	.07	¼ lb. .18	incl.
Fe.....0.001%	Typical Analysis							
SiO <sub>2</sub> .....0.0005%								
CaO.....								
Cl.....								
POTASSIUM Bicarbonate.....	Merck Blue Label			.40	incl.		¼ lb. .20	incl.
Sulphates.....less than 0.004% as SO <sub>4</sub>								
Chlorides.....less than 0.00075% as Cl								
Nitrogen.....less than 0.01% as N <sub>2</sub> O <sub>5</sub>								
Sulphur.....less than 0.0005% as S								
Aluminum.....less than 0.04%	Guaranteed Analysis							
Heavy metals.....none								
Phosphates.....less than 0.004% as P <sub>2</sub> O <sub>5</sub>								
Iron.....less than 0.0009%								
Residue on ignition.....69%								
POTASSIUM Bicarbonate.....	Kahlbaum "C.f.A."					100 grm.	.45	incl.
" Bicarbonate.....	Kahlbaum "C.f.A."					500 grm.	.80	incl.
Chloride.....none								
Sulphate.....none								
Nitrate.....none								
Phosphate.....none								
Lime.....none								
Alumina.....none	In 10 grams							
Heavy metals (Iron, etc.).....none	Certified Analysis							
Silica.....none								
Residue on ignition.....69.04%								
Content.....99.64%								
Moisture.....remainder								
POTASSIUM Bichromate, crystals.....		.15	cc	.04				
" Bichromate, powder.....		.20	cc	.04				
" Bichromate, c. p., crystals.....	Baker Analyzed	.45	cb	.07		¼ lb. .20	incl.	
" Bichromate, c. p., powder.....	Baker Analyzed	.50	cb	.07		¼ lb. .20	incl.	
Cl.....0.001%	Typical Analysis							
SO <sub>4</sub> .....0.001%								
CaO.....none								
POTASSIUM Bichromate.....	Merck Blue Label	.60	incl.			¼ lb. .25	incl.	
Sulphates.....less than 0.029% as SO <sub>4</sub>								
Chlorides.....less than 0.0023% as Cl	Guaranteed Analysis							
Alumina.....less than 0.1% as Al								
Alkaline earths.....less than 0.0095% as Ca								
POTASSIUM Bichromate.....	Kahlbaum "C.f.A."					100 grm.	.55	incl.

		Maker or Brand	Ounce and pound prices		Price in other size packages					
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.	
POTASSIUM	Bichromate.....	Kahlbaum "C.f.A."					500 grm.	1.00	incl	
	Content.....found 99.97%									
	Sulphates.....none	In 10 grams } Certified Analysis								
	Chlorides.....trace									
	Alkaline earths.....none									
	Alumina.....none									
POTASSIUM	Bichromate, c. p., fused....	Merck Blue Label	.75	cb	.07		¼ lb.	.25	incl	
"	Binodate.....		.85	incl			¼ oz.	.30	incl	
	Chlorates.....less than 0.15% as ClO <sub>3</sub>									
POTASSIUM	Binoxalate, c. p.....	Baker Analyzed	.50	cb	.08		¼ lb.	.20	incl	
"	Bisulphate, pure, crystals....		.35	cb	.09					
"	Bisulphate, c. p., crystals....	Baker Analyzed	.40	cb	.08		¼ lb.	.20	incl	
	Fe.....0.0007%	Typical Analysis								
	SiO <sub>2</sub> .....0.005%									
	Cl.....0.001%									
	Al <sub>2</sub> O <sub>3</sub> .....0.001%									
	Acidity (H <sub>2</sub> SO <sub>4</sub> ).....36.5%									
POTASSIUM	Bisulphate.....	Merck Blue Label	.60	incl			¼ lb.	.25	incl	
	Heavy metals.....none	Guaranteed Analysis								
	Chlorides.....less than 0.002% as Cl									
	Arsenic.....less than 0.0015%									
POTASSIUM	Bisulphate, crystals.....	Kahlbaum "C.f.A."					200 grm.	.65	incl	
	Content.....found 100.01%	In 10 grams } Certified Analysis								
	Arsenic.....none									
	Heavy metals.....none									
	Chlorides.....slight trace									
POTASSIUM	Bisulphate, c. p., fused (Pyro).....	Baker Analyzed	.60	cb	.07		¼ lb.	.22	incl	
	Fe.....0.0004%	Typical Analysis								
	SiO <sub>2</sub> .....0.001%									
	Cl.....0.0001%									
	Acidity (H <sub>2</sub> SO <sub>4</sub> ).....35.2%									
	CaO.....none									
POTASSIUM	Bisulphite, granular.....	Baker Analyzed	.40	cb	.09					
"	Bisulphite, c. p.....	Baker Analyzed	.75	cb	.08		¼ lb.	.25	incl	
	Fe.....0.0003%	Typical Analysis								
	Al <sub>2</sub> O <sub>3</sub> .....0.0002%									
	CaO.....0.001%									
	MgO.....0.001%									
	Cl.....0.001%									
	SO <sub>2</sub> (available).....48.4%									
POTASSIUM	Bisulphite, meta.....	Merck Blue Label	.80	incl			¼ lb.	.30	incl	
	Chlorides.....less than 0.002% as Cl	Guaranteed Analysis								
	Heavy metals.....None									
	Arsenic.....less than 0.0002%									
POTASSIUM	Bitartrate, crude (Argols)...		.10	cc	.04					
"	Bitartrate, pure, powder (Cream Tartar).....		.35	cc	.04					
POTASSIUM	Bitartrate, c. p., crystals....	Baker Analyzed	.75	cb	.09		¼ lb.	.25	incl	
"	Bitartrate, c. p., powder....	Baker Analyzed	.80	cb	.09		¼ lb.	.25	incl	
POTASSIUM	Bitartrate.....	Merck Blue Label	.20	incl			½ lb.	1.00	incl	
	Moisture.....none	Guaranteed Analysis								
	Chlorides.....less than 0.002% as Cl									
	Sulphates.....less than 0.035% as SO <sub>2</sub>									
	Ammonium compounds.....less than 0.00175% as NH <sub>3</sub>									
	Calcium.....less than 0.023%									
	Heavy metals.....none									
POTASSIUM	Borate, c. p.....	Baker Analyzed	1.00	cb	.08		¼ lb.	.35	incl	
"	Bromate.....		.75	cb	.09					
"	Bromate, c. p.....	Baker Analyzed	.25	incl	2.25	cb	.07	¼ lb.	.75	incl
	Bromide.....none	Typical Analysis								
	CO <sub>2</sub> .....none									
	Cl.....0.001%									
	SO <sub>2</sub> .....none									
POTASSIUM	Bromate.....	Merck Blue Label	.30	incl			¼ lb.	1.00	incl	
	Potassium Bromide.....less than 0.04%									
"	Bromide, crystals or powder.....		.51	cc	.04					
"	Bromide, c. p.....	Baker Analyzed	.85	cb	.07		¼ lb.	.25	incl	
	Cl.....trace	Typical Analysis								
	SiO <sub>2</sub> .....0.001%									
	Na.....trace									
	Fe.....0.0002%									
	Bromate.....none									
POTASSIUM	Bromide.....	Merck Blue Label	1.00	incl			¼ lb.	.35	incl	
	Potassium Carbonate.....less than 0.04%	Guaranteed Analysis								
	Potassium Bromate.....less than 0.001%									
	Heavy metals.....none									
	Sulphates.....less than 0.00125% as SO <sub>2</sub>									
	Barium salts.....less than 0.002% Ba									
	Iodides.....less than 0.1% I									
	Excess of Potassium Chloride.....not more than 1.3%									
POTASSIUM	Carbonate (Pearl Ash) 90%.....		.12	cb	.08					
"	Carbonate, pure, powder.....		.18	cb	.08					



## A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages	
		Maker or Brand		per oz. cont.		size pkg.	per pkg. cont.
POTASSIUM	Carbonate, c. p., crystals ..	Baker Analyzed		.25 cb	.08	¼ lb.	.15 incl
	Fe.....0.0004%						
	Al <sub>2</sub> O <sub>3</sub> .....0.0002%						
	SiO <sub>2</sub> .....0.003%	Typical					
	CaO.....0.001%	Analysis					
	Cl.....0.002%						
	SO <sub>2</sub> .....-0.001%						
POTASSIUM	Carbonate.....	Merck Blue Label		.80	incl	¼ lb.	.30 incl
	Heavy metals.....none						
	Chlorides.....less than 0.002% as Cl						
	Sulphates.....less than 0.0075% as SO <sub>3</sub>						
	Nitrates.....less than 0.08% as NaO <sub>2</sub>						
	Potassium Cyanide.....less than 0.048%CN						
	Sulphides.....less than 0.02%S	Guaranteed					
	Sulphites.....less than 0.008% as SO <sub>2</sub>	Analysis					
	Thiosulphates.....less than 0.08% as K <sub>2</sub> S <sub>2</sub> O <sub>3</sub>						
	Phosphates.....less than 0.004% as P <sub>2</sub> O <sub>5</sub>						
	Silicates.....none						
	Alumina.....less than 0.004%						
	Calcium.....less than 0.001%						
POTASSIUM	Carbonate.....	Kahlbaum "C.f.A."				100 grm.	.60 incl
"	Carbonate.....	Kahlbaum "C.f.A."				500 grm.	1.30 incl
	Content K <sub>2</sub> CO <sub>3</sub> .....97.15%						
	H <sub>2</sub> O.....2.88%						
	Chloride.....slight trace						
	Sulphate.....none						
	Phosphate.....none						
	Silicate.....none						
	Nitrate.....none	in 10					
	Alkaline earths.....none	grams					
	Cyanide.....none	Certified					
	Alumina.....none	Analysis					
	Sulphite, Sulphide and						
	Thiosulphate.....none						
	Heavy metals.....none						
POTASSIUM	Carbonate, c. p., anhydrous	Baker Analyzed		.40 cb	.08	¼ lb.	.18 incl
	Fe.....0.0003%						
	Al <sub>2</sub> O <sub>3</sub> .....0.0001%						
	SiO <sub>2</sub> .....0.003%	Typical					
	CaO.....0.001%	Analysis					
	Cl.....0.002%						
	SO <sub>2</sub> .....0.002%						
POTASSIUM	Carbonate, c. p., anhydrous	Baker Special		.60 cb	.08	¼ lb.	.22 incl
	SO <sub>2</sub> .....0.001%						
POTASSIUM	Carbonate, solution, about						
	33%.....	Merck Blue Label		.65	incl	¼ lb.	.25 incl
	Tested for the same substances as						
	Potassium Carbonate (using 3 cc.	Guaranteed					
	solution instead of 1 gram Potas-	Analysis					
	sium Carbonate)						
°POTASSIUM	Chlorate, crystals.....			.15 cc	.04		
"	Chlorate, powder.....			.15 cc	.04		
"	Chlorate, c. p., small crystals	Baker Analyzed		.35 cb	.08	¼ lb.	.20 incl
"	Chlorate, c. p., large crystals	Baker Analyzed		.40 cb	.08	¼ lb.	.20 incl
"	Chlorate, c. p., powder.....	Baker Analyzed		.40 cb	.08	¼ lb.	.20 incl
	Fe.....0.0002%						
	CaO.....none	Typical					
	Cl.....0.001%	Analysis					
	SO <sub>2</sub> .....0.001%						
°POTASSIUM	Chlorate.....	Merck Blue Label		.50	incl	¼ lb.	.20 incl
	Chlorides.....less than 0.001% as Cl						
	Heavy metals.....none						
	Calcium.....less than 0.005%						
	Bromates.....less than 0.08% as BrO <sub>3</sub>	Guaranteed					
	Nitrates.....less than 0.0016% as N <sub>2</sub> O <sub>5</sub>	Analysis					
	Sulphates.....less than 0.001% as SO <sub>3</sub>						
	Arsenic.....less than 0.0009%						
°POTASSIUM	Chlorate.....	Kahlbaum "C.f.A."				500 grm.	.85 incl
"	Chlorate.....	Kahlbaum "C.f.A."				1000 grm.	1.35 incl
	Arsenic.....none						
	Sulphate.....none						
	Nitrate.....none	in 10					
	Chloride.....none	grams					
	Heavy metals.....none	Certified					
	Alkaline earths.....none	Analysis					
POTASSIUM	Chloride, pure.....			.18 cc	.04		
"	Chloride, c. p.....	Baker Analyzed		.25 cb	.08	¼ lb.	.15 incl
	Fe.....0.0002%						
	CaO.....-0.001%	Typical					
	Na.....trace	Analysis					
	SiO <sub>2</sub> .....-0.001%						
	MgO.....trace						
POTASSIUM	Chloride.....	Merck Blue Label		.60	incl	¼ lb.	.25 incl
	Heavy metals.....none						
	Alkaline						
	earths.....less than 0.01% as Ca	Guaranteed					
	Sulphates.....less than 0.001% as SO <sub>3</sub>	Analysis					
	Nitrates.....less than 0.0032% as N <sub>2</sub> O <sub>5</sub>						
	Chlorates.....less than 0.018% as Cl <sub>2</sub> O <sub>7</sub>						
	Magnesium.....less than 0.002%						

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
POTASSIUM	Chloride.....	Kahlbaum "C.f.A.".....					500 grm.	.90	incl
	Heavy metals.....none								
	Alkaline earths.....none in 10	Certified							
	Sulphate.....none grams	Analysis							
POTASSIUM	Chloride, c. p. (Sodium free).....	Baker Special	.50	cb	.08		¼ lb.	.20	incl
"	Chromate, yellow.....		.30	cc	.04				
"	Chromate, neutral, pure.....		.35	cb	.07				
POTASSIUM	Chromate, c. p.....	Baker Analyzed	.50	cb	.07		¼ lb.	.20	incl
	CaO.....none								
	Cl.....—0.641%	Typical							
	SO <sub>2</sub> .....—0.602%	Analysis							
	Fe.....0.0002%								
POTASSIUM	Chromate.....	Merck Blue Label	1.00		incl		¼ lb.	.35	incl
	Free alkali.....less than 0.2% as KOH								
	Sulphates.....less than 0.02% as SO <sub>2</sub>								
	Chlorides.....less than 0.0025% as Cl	Guaranteed							
	Alumina.....less than 0.1% as Al	Analysis							
	Alkaline earths.....less than 0.005% as Ca								
POTASSIUM	Chromate.....	Kahlbaum "C.f.A.".....					100 grm.	.75	incl
"	Chromate.....	Kahlbaum "C.f.A.".....					500 grm.	1.95	incl
	Free alkali.....none								
	Sulphate.....none								
	Chloride.....none in 10	Certified							
	Alkaline earths.....none grams	Analysis							
	Alumina.....none								
	Content.....98.88%								
	Moisture.....1.09%								
POTASSIUM	Citrate, granular.....		.65	cc	.04				
"	Citrate, c. p.....	Baker Analyzed	1.00	cb	.08		¼ lb.	.35	incl
	Fe.....—0.001%								
	Pb.....none	Typical							
	SO <sub>2</sub> .....0.002%	Analysis							
	CO <sub>2</sub> .....0.080%								
POTASSIUM	Cyanate, Mixture, fused, technical (98-99%).....		.60	incl	6.00	cb	.08	¼ lb.	1.85
"	Cyanate Mixture, powder (98-99%).....								
"	Cyanate Mixture, powder (98-99%).....								
POTASSIUM	Cyanide Mixture, lump (98-100%).....	Baker Analyzed	.45	cb	.08		¼ lb.	.20	incl
"	Cyanide Mixture, powder (98-100%).....	Baker Analyzed	.60	cb	.08		¼ lb.	.20	incl
	CN.....39.85%								
	Fe.....0.003%	Typical							
	Al <sub>2</sub> O <sub>3</sub> .....0.001%	Analysis							
	Na.....present								
POTASSIUM	Cyanide.....	Merck Blue Label	.35	incl			¼ lb.	1.00	incl
	Sulphides.....less than 0.003% as S								
	Carbonates.....less than 4% CO <sub>2</sub>								
	Sulphocyanates.....less than 0.015% as SCN	Guaranteed							
	Ferrocyanides.....less than 0.005% as Fe(CN) <sub>6</sub>	Analysis							
	Sulphates.....less than 0.0875% as SO <sub>2</sub>								
	Chlorides.....less than 0.004% as Cl								
POTASSIUM	Cyanide.....	Kahlbaum "C.f.A.".....					50 grm.	.90	incl
"	Cyanide.....	Kahlbaum "C.f.A.".....					100 grm.	1.45	incl
	Sulphate.....none								
	Ferrocyanide and Sulphocyanide.....none in 10	Certified							
	Sulphide.....none grams	Analysis							
	Carbonate.....none								
	Content.....99.74%								
POTASSIUM	Dichromate (See Bichromate).....								
"	Ferricyanide, coml., cryst.....		.45	cc	.04				
"	Ferricyanide, pure.....		.65	cb	.08				
POTASSIUM	Ferricyanide, c. p.....	Baker Analyzed	1.00	cb	.08		¼ lb.	.35	incl
	Cl.....trace								
	SO <sub>2</sub> .....0.030%	Typical							
	Na.....trace	Analysis							
POTASSIUM	Ferricyanide.....	Merck Blue Label	1.60		incl		¼ lb.	.50	incl
	Ferrous salts.....not more than 0.056% Fe	Guaranteed							
	Sulphates.....less than 0.005% as SO <sub>2</sub>	Analysis							
	Chlorides.....less than 0.01% as Cl								
POTASSIUM	Ferricyanide.....	Kahlbaum "C.f.A.".....					100 grm.	.95	incl
	Sulphate.....none								
	Ferrous salts.....none in 10	Certified							
	Chloride.....faint trace grams	Analysis							
	Content.....99.69%								
POTASSIUM	Ferrocyanide, yellow, cryst.....		.28	cc	.04				
"	Ferrocyanide, pure, powder, anhydrous.....								
POTASSIUM	Ferrocyanide, c. p.....	Baker Analyzed	.60	cb	.08		¼ lb.	.22	incl
	Cl.....0.001%		.60	cb	.08		¼ lb.	.22	incl
	SO <sub>2</sub> .....0.002%	Typical							
	Na.....trace	Analysis							



# A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices			Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.
							cont.
POTASSIUM	Iodide, c. p.	Baker Special	.50	incl	5.00 cb	.06	1/4 lb. 1.55 incl
"	Molybdate, c. p.		.45	incl			
"	Nitrate, granular				.20 cc	.04	
"	Nitrate, pure, crystals				.20 cc	.04	
*POTASSIUM	Nitrate c. p., crystals	Baker Analyzed			.30 cb	.08	1/4 lb. .18 incl
"	Nitrate c. p., powdered	Baker Analyzed			.35 cb	.08	1/4 lb. .18 incl
	Cl.....0.001%						
	SO <sub>2</sub> .....none	Typical					
	CaO.....none	Analysis					
	Na.....trace						
	Perchlorate.....trace						
*POTASSIUM	Nitrate	Merck Blue Label			.80	incl	1/4 lb. .30 incl
	Sulphates.....less than 0.0023% as SO <sub>2</sub>						
	Chlorides.....less than 0.0005% as Cl						
	Chlorates and Perchlorates.....less than 0.0005% as Cl <sub>2</sub> O <sub>7</sub>						
	Calcium.....less than 0.01%	Guaranteed					
	Heavy metals.....none	Analysis					
	Iron.....less than 0.0008%						
	Nitrites.....less than 0.00035% as N <sub>2</sub> O <sub>5</sub>						
*POTASSIUM	Nitrate	Kahlbaum "C.f.A."					100 grm. .60 incl
"	Nitrate	Kahlbaum "C.f.A."					500 grm. 1.50 incl
	Alkaline earths.....none						
	Heavy metals.....none						
	Sulphate.....none	In 10					
	Chloride.....none	grams					
	Chlorate.....none						
	Nitrite.....none						
*POTASSIUM	Nitrate, c. p., fused				.55 cb	.08	1/4 lb. .20 incl
POTASSIUM	Nitrite, c. p., crystals	Baker Analyzed	.15	incl	.80 cb	.08	1/4 lb. .40 incl
"	Nitrite, c. p., sticks	Baker Analyzed	.15	incl	1.15 cb	.08	1/4 lb. .40 incl
	KNO <sub>3</sub> .....						
	Cl.....0.01%						
	SO <sub>2</sub> .....0.001%	Typical					
	CaO.....0.001%	Analysis					
	Fe.....0.0001%						
	I.....none						
POTASSIUM	Nitrite, sticks	Merck Blue Label			1.50	incl	1/4 lb. .50 incl
	Heavy metals.....none						
	Chlorides.....less than 0.002% as Cl	Guaranteed					
	Sulphates.....less than 0.175% as SO <sub>2</sub>	Analysis					
POTASSIUM	Oxalate, neutral, crystals				.25 cc	.04	
"	Oxalate, c. p.	Baker Analyzed			.45 cb	.07	1/4 lb. .20 incl
	Fe.....-0.0004%						
	CaO.....0.001%	Typical					
	Na.....trace	Analysis					
	Cl.....0.0003%						
	SO <sub>2</sub> .....none						
POTASSIUM	Oxalate, neutral	Merck Blue Label			1.25	incl	1/4 lb. .40 incl
	Neutrality.....less than 0.0045% acid as H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>						
	Sulphates.....less than 0.003% as SO <sub>2</sub>	Guaranteed					
	Chlorides.....less than 0.0025% as Cl	Analysis					
	Heavy metals.....none						
POTASSIUM	Oxalate, neutral	Kahlbaum "C.f.A."					100 grm. .80 incl
"	Oxalate, neutral	Kahlbaum "C.f.A."					500 grm. 2.25 incl
	Chloride.....faint trace						
	Iron.....	In 10					
	Heavy metals.....none	grams					
	Sulphate.....none						
	Content.....100.00%						
*POTASSIUM	Perchlorate		.15	incl	1.40 cb	.07	1/4 lb. .45 incl
"	Perchlorate	Merck Blue Label	.30	incl			
	Calcium.....less than 0.02%						
	Chlorides.....less than 0.002% as Cl						
	Heavy metals.....none	Guaranteed					
	Nitrates.....less than 0.0016% as N <sub>2</sub> O <sub>5</sub>	Analysis					
	Sulphates.....less than 0.003% as SO <sub>2</sub>						
*POTASSIUM	Permanganate, pure, crystals				.25 cc	.04	
"	Permanganate, c. p., small crystals	Baker Analyzed	.10	incl	.55 cb	.07	1/4 lb. .20 incl
	Cl.....0.0002%						
	SO <sub>2</sub> .....0.002%	Typical					
	CaO.....none	Analysis					
	Fe.....0.0002%						
*POTASSIUM	Permanganate	Merck Blue Label			.60	incl	1/4 lb. .25 incl
	Sulphates.....less than 0.03% as SO <sub>2</sub>						
	Chlorides.....less than 0.004% as Cl	Guaranteed					
	Nitrates.....less than 0.08% as N <sub>2</sub> O <sub>5</sub>	Analysis					
	Chlorates.....less than 0.0016% as Cl <sub>2</sub> O <sub>7</sub>						
*POTASSIUM	Permanganate, free from sulphates	Merck Blue Label			1.25	incl	1/4 lb. .40 incl
	Sulphates.....less than 0.003% as SO <sub>2</sub>						
	Chlorides.....less than 0.004% as Cl	Guaranteed					
	Nitrates.....less than 0.08% as N <sub>2</sub> O <sub>5</sub>	Analysis					
	Chlorates.....less than 0.0016% as Cl <sub>2</sub> O <sub>7</sub>						
*POTASSIUM	Permanganate	Kahlbaum "C.f.A."					100 grm. .80 incl



## A R T H U R H. T H O M A S C O M P A N Y

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
POTASSIUM	Permanganate.....	Kahlbaum "C.f.A."					500 grm.	1.95	incl
	Sulphate.....none								
	Chlorate.....none	In 10 grams							
	Nitrate.....none								
	Content.....99.64%								
	Moisture.....remainder								
POTASSIUM	Permanganate, c. p., large crystals.....	Baker Special	.10	incl	.75	cb .07	1/4 lb.	.25	incl
"	Sulphate, c. p.....	Baker Analyzed			2.00	cb .08	1/4 lb.	.65	incl
	Fe.....-0.001%								
	Al.....trace	Typical Analysis							
	Cl.....-0.001%								
	NH <sub>3</sub> .....trace								
	Moisture.....none								
POTASSIUM	Phosphate.....	Merck Blue Label			1.25	incl	1/4 lb.	.40	incl
	Chlorides.....less than 0.002% as Cl	Guaranteed Analysis							
	Heavy metals.....none, or at most a trace								
POTASSIUM	Phosphate, c. p., monobasic (KH <sub>2</sub> PO <sub>4</sub> ).....	Baker Analyzed			.75	cb .07	1/4 lb.	.25	incl
	Fe.....0.001%								
	Na.....trace	Typical Analysis							
	Cl.....0.002%								
	SO <sub>3</sub> .....0.003%								
POTASSIUM	Phosphate, c. p., dibasic (K <sub>2</sub> HPO <sub>4</sub> ).....	Baker Analyzed			.75	cb .08	1/4 lb.	.25	incl
	Fe.....0.003%								
	Al <sub>2</sub> O <sub>3</sub> .....0.003%								
	SiO <sub>2</sub> .....0.001%	Typical Analysis							
	CaO.....0.002%								
	C.....0.0002%								
	SO <sub>3</sub> .....0.002%								
POTASSIUM	Phosphate, c. p., tribasic, (K <sub>3</sub> PO <sub>4</sub> ).....	Baker Analyzed			.90	cb .08	1/4 lb.	.35	incl
	CaO.....0.001%								
	Fe.....0.001%	Typical Analysis							
	Cl.....0.001%								
	SO <sub>3</sub> .....0.001%								
POTASSIUM	Pyroantimonate (acid).....	Merck Blue Label	.20	incl			1/2 lb.	1.10	incl
	Tested for suitability as a reagent for Sodium.								
POTASSIUM	Pyrophosphate, c. p.....				1.25	cb .08	1/4 lb.	.40	incl
"	Silicate, coml., lump.....				.20	cc .04			
"	Silicofluoride, c. p.....		.20	incl	2.00	cb .08	1/4 lb.	.65	incl
POTASSIUM	Stannosulphate, tested reagent.....	Merck Blue Label	.35	incl					
"	Sulphate, pure, crystals.....				.15	cc .04			
"	Sulphate, pure, powder.....				.18	cc .04			
POTASSIUM	Sulphate, c. p., crystals.....	Baker Analyzed			.30	cb .07	1/4 lb.	.17	incl
"	Sulphate, c. p., powder.....	Baker Analyzed			.35	cb .07	1/4 lb.	.17	incl
	Fe.....0.001%								
	CaO.....0.001%	Typical Analysis							
	Al <sub>2</sub> O <sub>3</sub> .....0.001%								
	Cl.....0.002%								
	N.....0.003%								
POTASSIUM	Sulphate.....	Merck Blue Label			.45	incl	1/4 lb.	.20	incl
	Chlorides.....less than 0.001% as Cl								
	Heavy metals (Cu, Fe).....none								
	Calcium.....less than 0.02%	Guaranteed Analysis							
	Magnesium.....less than 0.003%								
	Iron.....less than 0.0008%								
	Nitrates.....less than 0.0032% as NaO <sub>2</sub>								
	Ammonium salts.....less than 0.003% as NH <sub>3</sub>								
POTASSIUM	Sulphate.....	Kahlbaum "C.f.A."					500 grm.	.75	incl
"	Sulphate.....	Kahlbaum "C.f.A."					1000 grm.	1.20	incl
	Heavy metals.....none								
	Alkaline earths.....none	In 10 grams							
	Chloride.....slight trace	Certified Analysis							
	Sodium.....none								
POTASSIUM	Sulphate, c. p.....	Baker Special			.50	cb .07	1/4 lb.	.20	incl
	Fe.....-0.001%								
	Al.....-0.001%	Typical Analysis							
	V <sub>2</sub> O <sub>5</sub> .....0.001%								
	C.....-0.001%								
	N.....0.0005%								
POTASSIUM	Sulphide, pure, lumps, (Liver of Sulphur).....				.20	cb .08			
"	Sulphide.....	Merck Blue Label			.80	incl	1/4 lb.	.30	incl
	Nitrogen.....not more than 0.0112%								
POTASSIUM	Sulphide Solution, 5%.....	Merck Blue Label			.50	incl			
	Nitrogen.....not more than 0.00056%								
POTASSIUM	Sulphide, c. p., crystals.....	Baker Analyzed	.10	incl	.60	gb .15	1/4 lb.	.22	incl
	Fe.....0.001%								
	Al <sub>2</sub> O <sub>3</sub> .....-0.001%	Typical Analysis							
	Cl.....0.030%								
	SiO <sub>2</sub> .....present								

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	co. l.	size pkg.	per pkg.	cont.
POTASSIUM	Sulphide, c. p., crystals.....	Baker Special	.10	incl	1.00	gb	.15	¼ lb.	.35 incl
	Fe..... 0.000%	Typical Analysis							
	Al <sub>2</sub> O <sub>3</sub> ..... —0.001%								
	Cl..... 0.020%								
	SO <sub>2</sub> ..... present								
POTASSIUM	Sulphite, c. p., crystals.....	Baker Analyzed			.60	cb	.08	¼ lb.	.22 incl
	Sulphocyanate (Thiocyanate) pure, crystals.....						incl		
POTASSIUM	Sulphocyanate, c. p., crystals.....	Baker Analyzed	.10	incl	1.00	cb	.09	¼ lb.	.35 incl
	Fe..... 0.0001%	Typical Analysis							
	NH <sub>3</sub> ..... trace								
	Cl..... 0.020%								
	Substances insoluble in Alcohol..... none								
POTASSIUM	Sulphocyanate.....	Merck Blue Label	.25	incl				½ lb.	1.00 incl
	Chlorides..... less than 0.0025% as Cl	Guaranteed Analysis							
	Sulphates..... less than 0.01% as SO <sub>2</sub>								
	Heavy metals..... none								
	Iron..... less than 0.0004%								
POTASSIUM	Sulphocyanate.....	Kahlbaum "C.f.A."					100 grm.	1.15	incl
	Heavy metals..... none	Kahlbaum "C.f.A."					500 grm.	3.75	incl
	Sulphate..... not present	In 10 grams { Certified Analysis							
	Chloride..... not present								
	Iron..... undeterminable trace								
	Solubility in Alcohol..... complete								
POTASSIUM	Sulphhydrate.....	Merck Blue Label	.25	incl				½ lb.	1.25 incl
	(Potassium Hydrosulphide) Polysulphides..... none								
POTASSIUM	Tartrate, granular.....				.55	cb	.09		
	Tartrate, c. p., crystals.....	Baker Analyzed			.80	cb	.08	¼ lb.	.30 incl
	Tetroxalate, c. p., crystals.....	Baker Analyzed	.10	incl	1.10	cb	.08	¼ lb.	.35 incl
	Fe..... 0.0002%	Typical Analysis							
	SO <sub>2</sub> ..... —0.001%								
	CaO..... 0.007%								
	Cl..... none								
POTASSIUM	Tetroxalate.....	Merck Blue Label			1.50	incl		¼ lb.	.50 incl
	Chlorides..... less than 0.0025% as Cl	Guaranteed Analysis							
	Sulphates..... less than 0.0063% as SO <sub>2</sub>								
	Heavy metals..... none								
	Iron..... less than 0.0004%								
POTASSIUM	Thiocyanate (See Potassium Sulphocyanate).....								
	Thiosulphate, c. p., crystals.....		.20	incl	2.00	cb	.08	¼ lb.	.65 incl
POTASSIUM	Zinc Sulphate, c. p., crystals.....	Baker Analyzed			.30	cb	.08	¼ lb.	.30 incl
PUMICE	Stone, lumps.....				.10	cc	.04		
	Stone, powder.....				.10	cc	.04		
PYRIDINE	technical.....				.75	incl			
	medicinal.....				3.00	gb	.14		
PYRIDINE	c. p., crystals.....	Baker Analyzed	.30	incl	3.00	cb	.08	¼ lb.	1.00 incl
	Sp. gr. 1.077	Typical Analysis							
	B. P. 116°-118°C								
PYROGALLOL	(See Acid Pyrogallol).....								
QUERCIT	.....						1 grm.	.50	incl
RADIUM	Information concerning Radium and Radium Salts on application.....						10 grm.	.90	incl
RAFFINOSE	(Melleotose).....								
REALGAR	red (See Arsenic Sulphide).....								
ROSIN	white.....				.12	cc	.04		
	yellow.....				.10	cc	.04		
RESORCIN	white, crystals.....		.15	cb	.03	1.15	cb	.08	
RESORCIN	.....	Merck Blue Label	.60	incl				¼ oz.	.25 incl
	Nonvolatile matter..... less than 0.05%	Guaranteed Analysis							
	Di-resorcin and Phenol..... none								
	Free acids (e.g. Salicylic Acid)..... none								
RHAMNOSE	(Isodulcite).....						10 grm.	1.80	incl
ROCHELLE Salts	(See Sodium and Potassium Tartrate).....								
ROUGE	for polishing, Ferric Oxide.....				.35	cb	.08		
RUBIDIUM Chloride	.....						10 grm.	1.50	incl
SACCHARIN	c. p., crystals.....		.20	incl	2.00	cb	.08	¼ lb.	.70 incl
SACCHAROSE	c. p. (Cane Sugar).....				1.00	cb	.08	¼ lb.	.35 incl
SACCHAROSE	.....	Kahlbaum			1.60	incl			
SAL AMMONIAC	(See Ammonium Chloride).....								
SALICIN	.....						10 grm.	.40	incl
SAL SODA	(See Sodium Carbonate).....								
SAND, Quartz	.....	Merck Blue Label			1.00	incl		¼ lb.	.35 incl
	Substances soluble in Hydrochloric Acid..... not more than 0.03%	Guaranteed Analysis							
	Chlorides..... less than 0.002% as Cl								
	Volatile substances..... not more than 0.02%								

# A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
SAND, Sea.....								
“ “ washed and ignited.....				.10	incl			
“ “ washed and ignited.....	Merck Blue Label			.20	incl			
Substances soluble in Hydrochloric Acid.....	not more than 0.3% Chlorides.....			.40	incl	¼ lb.	.20	incl
Volatile substances.....	less than 0.002% as Cl } not more than 0.02%							
SAND, standard for briquettes.....				.10	incl	125 lb.	5.50	incl
SHELLAC, Orange, flakes.....				.45	cc .04			
“ bleached.....				.50	cc .04			
SILICA, powdered (Silicic Acid).....				.10	incl			
“ precipitated, technical.....				.40	incl			
SILICON, metal, c. p., crystals.....						1 gm.	.25	incl
SILVER, metal, pure, granulated.....		1.40	incl					
“ metal, foil.....		1.20	incl					
SILVER, metal, sheets.....	Merck Blue Label					¼ oz.	1.00	incl
Foreign metals.....	less than 0.023% }							
SILVER, leaf, pure, in books.....						book	.15	incl
“ Arsenite, c. p.....		1.50	incl					
SILVER Asbestos.....	Merck Blue Label					¼ oz.	1.50	incl
“ Asbestos.....	Merck Blue Label					¼ oz.	.50	incl
“ Chloride.....		.75	incl					
“ Chloride, c. p.....		1.00	incl					
“ Cyanide, c. p.....		1.00	incl					
“ Nitrate, c. p., crystals.....		.60	incl	8.75	cb .07			
*SILVER Nitrate, c. p., crystals.....	Baker Analyzed	.65	incl					
Fe.....	0.005% } Typical Analysis							
CaO.....	0.01% }							
Na.....	trace }							
Cl.....	none }							
SO <sub>2</sub> .....	none }							
*SILVER Nitrate, crystals.....	Merck Blue Label	.90	incl	13.50	incl	¼ lb.	3.50	incl
Chlorides.....	less than 0.002% }							
Potassium Nitrate.....	less than 2% }							
Salts of Copper.....	less than 0.002% Cu }							
Salts of Bismuth.....	less than 0.02% Bi }							
Salts of Lead.....	less than 0.3% Pb }							
Substances not precipitated by Hydrochloric Acid.....	less than 0.023% }							
*SILVER Nitrate, pure, sticks.....		.50	cb .04					
*SILVER Nitrate, sticks.....	Merck Blue Label	1.00	incl					
Chlorides.....	less than 0.002% as Cl }							
Potassium Nitrate.....	less than 2% }							
Salts of Copper.....	less than 0.002% Cu }							
Salts of Bismuth.....	less than 0.02% Bi }							
Salts of Lead.....	less than 0.3% Pb }							
Impurities not precipitated by Hydrochloric Acid.....	less than 0.023% }							
SILVER Nitrite, c. p.....		1.35	incl					
SILVER Nitrite.....	Merck Blue Label	2.50	incl			⅛ oz.	.40	incl
Substances not precipitated by Hydrochloric Acid.....	less than 0.023% }							
SILVER Sulphate, c. p.....		1.10	incl					
SOAP, Castile, bars.....				.25	incl			
“ Palm Oil.....						cake	.10	incl
SODA ASH (See Sodium Carbonate)								
SODA LIME (See Sodium Calcium Hydroxide)								
*SODIUM, metal, sticks.....		.25	incl	.90	incl			
* “ metal.....	Merck Blue Label	.30	incl			¼ lb.	.60	incl
Nitrogen compounds.....	less than 0.07% N }							
Foreign metals.....	none }							
SODIUM Acetate, crystals.....				.15	cb .09			
“ Acetate, crystals, pure, fused.....				.20	cb .08			
“ Acetate, c. p., crystals.....	Baker Analyzed			.30	cb .08	¼ lb.	.15	incl
Fe.....	0.005% } Typical Analysis							
Pb.....	none }							
SO <sub>2</sub> .....	0.005% }							
Cl.....	0.002% }							
SODIUM Acetate, crystals.....	Merck Blue Label			.40	incl	¼ lb.	.20	incl
Chlorides.....	less than 0.003% as Cl }							
Sulphates.....	less than 0.01% as SO <sub>4</sub> }							
Heavy metals.....	none }							
Calcium.....	less than 0.02% }							
Iron.....	less than 0.003% }							
SODIUM Acetate, crystals.....	Kahlbaum “C.f.A.”					500 grm.	.70	incl
“ Acetate, crystals.....	Kahlbaum “C.f.A.”					1000 grm.	1.10	incl
Iron.....	none }							
Other heavy metals.....	none }							
Lime.....	none }							
Chloride.....	none } In 10 grams } Certified Analysis							
Sulphate.....	none }							
Carbonate.....	none }							
Solubility in Alcohol.....	complete }							

## A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages		
		per oz.		per lb.		size pkg.	per pkg.	cont.
		cont.		cont.				
SODIUM		Maker or Brand						
Acetate, c. p., fused.....		Baker Analyzed		.50 cb .08		1/4 lb.	.20	incl
Fe.....								
Pb.....								
Cl.....								
SO <sub>4</sub> .....								
Acetate, c. p., anhydrous.....				.50 cb .08		1/4 lb.	.20	incl
Aluminate, c. p.....				1.50 cb .08		1/4 lb.	.50	incl
Amalgam, 5%, 10%, or 15%.....				.25 incl		1/4 lb.	.75	incl
Amalgam, 2%, tested reagent.....		Merck Blue Label		.30 incl		1/4 lb.	.75	incl
Ammonium Phosphate, (Micro-								
cosmic Salt) c. p.....		Baker Analyzed		.50 cb .08		1/4 lb.	.20	incl
Fe.....								
CaO.....								
Cl.....								
SO <sub>4</sub> .....								
Ammonium Phosphate.....		Merck Blue Label		.90 incl		1/4 lb.	.30	incl
Carbonates.....								
Sulphates.....								
Chlorides.....								
Nitrates.....								
Heavy metals.....								
Arsenic.....								
Potassium.....								
Ammonium Phosphate.....		Kahlbaum "C.f.a."				100 grm.	.60	incl
Ammonium Phosphate.....		Kahlbaum "C.f.a."				500 grm.	1.30	incl
Chloride.....								
Nitrate.....								
Sulphate.....								
Carbonate.....								
Heavy metals.....								
Arsenic.....								
Potassium (flame reaction).....								
Arsenate, technical.....				.20 cb .08				
Arsenate, c. p.....		Baker Analyzed		.50 cb .08		1/4 lb.	.20	incl
Arsenate, c. p., anhydrous.....				1.00 cb .08		1/4 lb.	.35	incl
Arsenite, technical, 90%.....				.20 cb .07				
Arsenite, c. p.....		Baker Analyzed		.70 cb .06		1/4 lb.	.24	incl
Asparaginate.....						10 grm.	.90	incl
Benzozate, pure.....				.55 cb .08		1/4 lb.	.20	incl
Bicarbonate, pure, powder.....				.10 cc .01				
Bicarbonate, c. p., powder.....		Baker Analyzed		.25 cb .08		1/4 lb.	.15	incl
Fe.....								
CaO.....								
AlO <sub>3</sub> .....								
SiO <sub>2</sub> .....								
Cl.....								
SO <sub>4</sub> .....								
Na <sub>2</sub> CO <sub>3</sub> .....								
Bicarbonate, crystals or powder.....		Merck Blue Label		.45 incl				
Sulphates.....								
Silicates.....								
Chlorides.....								
Thiosulphates.....								
Phosphates.....								
Heavy metals.....								
Iron.....								
Potassium.....								
Monocarbonate of Sodium (Neutral								
Sodium Carbonate).....								
Ammonium compounds.....								
Sulphocyanates.....								
Bicarbonate.....		Kahlbaum "C.f.a."				500 grm.	.75	incl
Bicarbonate.....		Kahlbaum "C.f.a."				1000 grm.	1.20	incl
Monocarbonate.....								
Residue on ignition.....								
Content.....								
Potassium Salts.....								
Ammonia.....								
Heavy metals.....								
Sulphocyanate.....								
Sulphate.....								
Chloride.....								
Silica.....								
Phosphate and Arsenate.....								
Thiosulphate.....								
Bichromate, technical.....				.15 cc .04				
Bichromate, c. p., crystals.....		Baker Analyzed		.45 cb .07		1/4 lb.	.20	incl
CaO.....								
Cl.....								
SO <sub>3</sub> .....								
Fe.....								
Bichromate.....		Kahlbaum "C.f.a."				100 grm.	.90	incl
Bichromate.....		Kahlbaum "C.f.a."				500 grm.	2.25	incl
Content.....								
Chloride.....								
Sulphate.....								
Alumina.....								
Alkaline earths.....								
Bincoxalate, c. p.....		Baker Analyzed		.60 cb .07		1/4 lb.	.22	incl



## A R T H U R H. T H O M A S C O M P A N Y

			Ounce and pound prices			Price in other size packages		
Maker or Brand			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.
								cont.
<b>SODIUM</b>	<b>Bismuthate, c. p.</b>	Baker Analyzed	.50	incl	4.50	cb .07	1/4 lb.	1.50 incl
	Cl..... none	Typical						
	Mn..... none	Analysis						
	Oxidizing power..... 77.6%							
<b>SODIUM</b>	<b>Bismuthate, c. p., crystals</b>	Merck Blue Label	.40	incl			1/4 lb.	1.25 incl
	CaO..... none	Baker Analyzed			.25	cb .08	1/4 lb.	.15 incl
	Al <sub>2</sub> O <sub>3</sub> ..... 0.0001%	Typical						
	MeO..... none	Analysis						
	SiO <sub>2</sub> ..... -0.001%							
	Cl..... 0.0002%							
	Acidity (H <sub>2</sub> SO <sub>4</sub> )..... 33.4%							
<b>SODIUM</b>	<b>Bisulphate</b>	Merck Blue Label			.60	incl	1/4 lb.	.25 incl
	Heavy metals..... none	Guaranteed						
	Chlorides..... less than 0.002% as Cl	Analysis						
	Arsenic..... less than 0.0015%							
	Potassium..... less than 0.4% K							
<b>SODIUM</b>	<b>Bisulphate, c. p., fused (Pyro)</b>	Baker Analyzed			.45	cb .07	1/4 lb.	.20 incl
	Fe..... 0.0005%	Typical						
	MgO..... none	Analysis						
	S <sub>2</sub> O..... 0.002%							
	Cl..... 0.003%							
	Acidity (H <sub>2</sub> SO <sub>4</sub> )..... 36%							
<b>SODIUM</b>	<b>Bisulphide, c. p.</b>				.50	cb .08	1/4 lb.	.20 incl
	Fe..... 0.0005%				.18	cb .09		
<b>SODIUM</b>	<b>Bisulphite, pure, powder</b>	Baker Analyzed			.30	cb .08	1/4 lb.	.15 incl
	Fe..... 0.0005%	Typical						
	Cl..... 0.001%	Analysis						
	MgO..... -0.001%							
	Cl..... 0.002%							
	Reducing power (SO <sub>2</sub> )..... 39.7%							
<b>SODIUM</b>	<b>Bisulphite</b>	Merck Blue Label			1.25	incl	1/4 lb.	.40 incl
	Chlorides..... less than 0.002% as Cl	Guaranteed						
	Heavy metals..... none	Analysis						
	Arsenic..... less than 0.0002%							
<b>SODIUM</b>	<b>Bitartrate, c. p.</b>	Baker Analyzed			1.00	cb .09	1/4 lb.	.35 incl
	Borate (Borax), pure, crystals				.15	cc .04		
<b>SODIUM</b>	<b>Borate (Borax), c. p., crystals</b>	Baker Analyzed			.35	cb .08	1/4 lb.	.17 incl
	Fe..... 0.0001%	Typical						
	Cl..... trace	Analysis						
	SO <sub>2</sub> ..... 0.001%							
<b>SODIUM</b>	<b>Borate (Borax) purest, crystals</b>	Merck Blue Label			.45	incl	1/4 lb.	.20 incl
	Proper Water content..... 47.1%	Guaranteed						
	Carbonate..... less than 2% as CO <sub>2</sub>	Analysis						
	Sulphates..... less than 0.0875% as SO <sub>2</sub>							
	Chlorides..... less than 0.0005% as Cl							
	Calcium..... less than 0.02%							
	Iron..... less than 0.0008%							
	Other metals..... none							
<b>SODIUM</b>	<b>Borate, crystals</b>	Kahlbaum "C.f.A."					100 grm.	.55 incl
	Borate, crystals	Kahlbaum "C.f.A."					500 grm.	1.00 incl
	Residue on ignition..... 52.87%	In 10						
	Chlorides..... none	gram						
	Sulphate..... none	Certified						
	Carbonate..... none	Analysis						
	Lime..... none							
	Heavy metals..... none							
	Content found..... 100.08%							
<b>SODIUM</b>	<b>Borate (Borax), pure, powder</b>				.15	cc .04		
	Borate, c. p., powder	Baker Analyzed			.40	cb .08	1/4 lb.	.17 incl
	Fe..... 0.0001%	Typical						
	CaO..... none	Analysis						
	CO <sub>2</sub> ..... trace							
	Cl..... -0.0001%							
	SiO <sub>2</sub> ..... 0.001%							
<b>SODIUM</b>	<b>Borate (Borax), calcined, purest</b>	Merck Blue Label			1.00	incl	1/4 lb.	.35 incl
	Proper Water content..... not more than 23%	Guaranteed						
	Carbonate..... less than 2% as CO <sub>2</sub>	Analysis						
	Sulphates..... less than 0.0875% as SO <sub>2</sub>							
	Chlorides..... less than 0.0005% as Cl							
	Calcium..... less than 0.02%							
	Iron..... less than 0.0008%							
	Other metals..... none							
<b>SODIUM</b>	<b>Borate, c. p., anhydrous, powder</b>				.60	cb .08	1/4 lb.	.22 incl
	Borate, fused (Borax Glass)				.25	cc .04	5 lb.	1.00 incl
<b>SODIUM</b>	<b>Borate, fused, purest</b>	Merck Blue Label			1.50	incl	1/4 lb.	.50 incl
	Carbonates..... less than 2% CO <sub>2</sub>	Guaranteed						
	Sulphates..... less than 0.0875% as SO <sub>2</sub>	Analysis						
	Chlorides..... less than 0.0005% as Cl							
	Calcium..... less than 0.02%							
	Iron..... less than 0.0008%							
	Other metals..... none							
<b>SODIUM</b>	<b>Bromate, c. p.</b>		.45	incl	4.30	cb .08	1/4 lb.	1.45 incl
	Bromate	Merck Blue Label	.40	incl				
	Bromides..... less than 0.03% as Br							
	Bromide, c. p.	Baker Analyzed			.80	cb .08	1/4 lb.	.35 incl

## A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg	per pkg. cont.	
Maker or Brand								
SODIUM	Calcium Hydrate (Soda Lime), dry, for Nitrogen determinations, granulated 4, 8 and 12 mesh.....	Baker Analyzed						
	NaOH.....	40%		.40 cb	.08	¼ lb.	.15 incl	
	Ca(OH) <sub>2</sub> .....	57%	Typical Analysis					
	H <sub>2</sub> O.....	2%						
“	Calcium Hydrate (Soda Lime), moist, for Carbon Dioxide determinations, granulated 4, 8 and 12 mesh.....	Baker Analyzed						
	NaOH.....	37%		.40 cb	.08	¼ lb.	.15 incl	
	Ca(OH) <sub>2</sub> .....	48%	Typical Analysis					
	H <sub>2</sub> O.....	13%						
SODIUM	Carbonate, crystals (Sal Soda).....	Baker Analyzed						
	Carbonate, c. p., crystals.....			.10 incl		10 lb.	.30 incl	
	Fe.....	0.002%	Typical Analysis	.25 cb	.08	¼ lb.	.15 incl	
	CaO.....	0.010%						
“	SiO <sub>2</sub> .....	0.001%						
	Cl.....	0.005%						
	SO <sub>3</sub> .....	—0.001%						
	SODIUM	Carbonate, crystals.....	Merck Blue Label					
Substances insoluble in water.....		none		.40 incl				
Sodium Hydroxide.....		less than 0.1%	Guaranteed Analysis					
Sulphates.....		less than 0.00125% as SO <sub>3</sub>						
“	Chlorides.....	less than 0.0001% as Cl						
	Silicates.....	none						
	Nitrates.....	less than 0.007% as Na <sub>2</sub> O						
	Phosphates.....	less than 0.001% as P <sub>2</sub> O <sub>5</sub>						
“	Potassium.....	less than 0.4% K						
	Ammonium compounds.....	less than 0.0001% as NH <sub>3</sub>						
	Calcium.....	less than 0.002%						
	Magnesium.....	less than 0.0002%						
“	Heavy metals.....	none						
	Iron.....	less than 0.00008%						
	Arsenic.....	less than 0.00003%						
	SODIUM	Carbonate, crystals.....	Kahlbaum “C.f.A.”					
Content.....		99.73%	In 10 grams	Certified Analysis			1000 grm.	.90 incl
Chloride.....		none						
“		Sulphate.....	none					
	Phosphate.....	none						
	Potassium (flame reaction).....	none						
	Arsenic.....	none						
“	Heavy metals.....	none						
	Alkaline earths.....	none						
	Carbonate, monohydrated, granular.....			.10 cc	.04	10 lb.	.60 incl	
	Carbonate, pure, dried powder.....			.15 cb	.09			
SODIUM	Carbonate, c. p., anhydrous.....	Baker Analyzed						
	Fe.....	0.001%	Typical Analysis	.30 cb	.08	¼ lb.	.15 incl	
	Al <sub>2</sub> O <sub>3</sub> .....	0.0003%						
	“	CaO.....	0.010%					
SiO <sub>2</sub> .....		0.001%						
Cl.....		0.002%						
SO <sub>3</sub> .....		0.020%						
“	P.....	trace						
	Loss on Ignition.....	0.210%						
	SODIUM	Carbonate (anhydrous).....	Merck Blue Label					
		Substances insoluble in water.....	none		.65 incl		¼ lb.	.25 incl
Sodium Hydroxide.....		less than 0.1%	Guaranteed Analysis					
Sulphates.....		less than 0.00125% as SO <sub>3</sub>						
“	Chlorides.....	less than 0.0001% as Cl						
	Silicates.....	none						
	Nitrates.....	less than 0.007% as Na <sub>2</sub> O						
	Phosphates.....	less than 0.001% as P <sub>2</sub> O <sub>5</sub>						
“	Potassium.....	less than 0.4% K						
	Ammonium compounds.....	less than 0.0001% as NH <sub>3</sub>						
	Calcium.....	less than 0.002%						
	Magnesium.....	less than 0.0002%						
“	Heavy metals.....	none						
	Iron.....	less than 0.00008%						
	Arsenic.....	less than 0.00003%						
	SODIUM	Carbonate, anhydrous.....	Kahlbaum “C.f.A.”					
Carbonate, anhydrous.....		Kahlbaum “C.f.A.”						
Content.....		99.47%	In 10 grams	Certified Analysis			500 grm.	1.00 incl
Moisture.....		remainder					1000 grm.	1.75 incl
“	Chloride.....	faint trace						
	Sulphate.....	none						
	Nitrate.....	none						
	Phosphate.....	none						
“	Silica.....	none						
	Sodium Hydrate.....	none						
	Potassium (flame reaction).....	faint trace						
	Arsenic.....	none						
“	Heavy metals.....	none						
	Ammonium Salts.....	faint trace						
	Alkaline earths.....	none						
	Solubility in Water.....	complete						

		Ounce and pound prices		Price in other size packages	
		per oz.	cont.	per lb.	cont.
		size pkg.	per pkg.	cont.	
SODIUM Carbonate, c. p., anhydrous.. Baker Special		.50 cb	.08	1/4 lb.	.20 incl
Fe.....	0.002%	Typical Analysis			
Al <sub>2</sub> O <sub>3</sub> .....	0.001%				
CaO.....	0.005%				
SiO <sub>2</sub> .....	0.001%				
Cl.....	0.001%				
SO <sub>2</sub> .....	0.001%	Typical Analysis			
P.....	none				
" Chlorate, c. p..... Baker Analyzed		.50 cb	.07	1/4 lb.	.15 incl
" Chloride, pure..... Baker Analyzed		.10 incl		1/4 lb.	.15 incl
SODIUM Chloride, c. p., crystals.. Baker Analyzed		.25 cb	.08	1/4 lb.	.15 incl
Fe.....	0.0002%	Typical Analysis			
CaO.....	0.001%				
MgO.....	0.001%				
SO <sub>2</sub> .....	0.001%				
SODIUM Chloride..... Merck Blue Label		.40	incl	1/4 lb.	.20 incl
Fe.....	0.0002%	Guaranteed Analysis			
Al <sub>2</sub> O <sub>3</sub> .....	0.001%				
CaO.....	0.001%				
MgO.....	0.001%				
SO <sub>2</sub> .....	0.001%				
SODIUM Chloride, c. p., crystals.. Baker Special		.40 cb	.08	1/4 lb.	.15 incl
CaO.....	0.0002%	Typical Analysis			
SO <sub>2</sub> .....	0.001%				
K.....	0.001%				
SODIUM Chloride, crystals..... Kahlbaum "C.f.A."				100 grm.	.50 incl
" Chloride, crystals..... Kahlbaum "C.f.A."				500 grm.	.90 incl
Content.....	99.98%	Certified Analysis			
Lime and Magnesia.....	none				
Ammonium salts.....	none				
Potassium.....	in 10				
Iron.....	grams				
Heavy metals.....	none	Guaranteed Analysis			
Iodine.....	none				
Sulphate.....	none				
SODIUM Chloride, c. p., fused..... Baker Analyzed		.45 cb	.08	1/4 lb.	.15 incl
Fe.....	0.0002%	Typical Analysis			
Al <sub>2</sub> O <sub>3</sub> .....	0.001%				
CaO.....	0.001%				
MgO.....	0.001%				
SO <sub>2</sub> .....	0.001%				
SODIUM Chloride, fused..... Merck Blue Label		.60	incl	1/4 lb.	.25 incl
Fe.....	0.0002%	Guaranteed Analysis			
Al <sub>2</sub> O <sub>3</sub> .....	0.001%				
CaO.....	0.001%				
MgO.....	0.001%				
SO <sub>2</sub> .....	0.001%				
SODIUM Chloride, fused..... Kahlbaum "C.f.A."				100 grm.	.60 incl
" Chloride, fused..... Kahlbaum "C.f.A."				500 grm.	1.40 incl
Content.....	100.00%	Certified Analysis			
Lime and Magnesia.....	none				
Ammonium salts.....	none				
Potassium.....	in 10				
Iron.....	grams				
Heavy metals.....	none	Guaranteed Analysis			
Iodine.....	none				
Sulphate.....	none				
SODIUM Chromate, c. p..... Baker Analyzed		.90 cb	.08	1/4 lb.	.35 incl
" Citrate, c. p..... Baker Analyzed		1.00 cb	.08	1/4 lb.	.35 incl
Fe.....	0.001%	Typical Analysis			
Al <sub>2</sub> O <sub>3</sub> .....	0.002%				
CaO.....	0.001%				
MgO.....	0.001%				
SO <sub>2</sub> .....	0.001%				
SODIUM Cobaltic Nitrite, c. p. (for Potassium Determinations)		.50	incl		
" Fluoride, technical.....		.18 cc	.01		
" Fluoride, c. p..... Baker Analyzed		.70 cb	.08	1/4 lb.	.30 incl
" Formate, c. p..... Baker Analyzed		1.00 cb	.08	1/4 lb.	.35 incl
" Hydroxide, crude, powder, 98%.....		.10	incl	10 lb.	.75 incl
" Hydroxide, crude, powder, 98%..... Greenbank				10 lb.	1.00 incl
" Hydroxide, pure, granulated (Ammonia free).....		.20 cb	.08	10 lb.	1.50 incl
" Hydroxide, electrolytic.....		.30 cb	.08	1/4 lb.	.17 incl
SODIUM Hydroxide, purified..... Merck Blue Label		.45	incl	1/4 lb.	.20 incl
Nitrogen as nitrates.....					
Aluminum.....	less than 0.002% as Na <sub>2</sub> O	Guaranteed Analysis			
Calcium.....	less than 0.01%				
Heavy metals.....	at most a trace				
Sodium Carbonate content.....	not over 5.3%				
SODIUM Hydroxide, c. p., by Alcohol.....		.60 cb	.08	1/4 lb.	.20 incl

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>SODIUM Hydroxide, by Alcohol</b> .....	Merck Blue Label							
Sulphates.....less than 0.025% as SO <sub>2</sub>	Guaranteed Analysis							
Chlorides.....less than 0.005% as Cl								
Nitrogen.....less than 0.002% as N <sub>2</sub> O <sub>5</sub>								
Nitrogen as nitrates								
nitrites, Ammonia, etc.....less than 0.0012% N								
Silicates.....not more than 0.06% as SiO <sub>2</sub>								
Aluminum.....not over 0.032%								
Calcium.....less than 0.005%								
Heavy metals.....at most a trace								
Sodium Carbonate content.....not over 4%								
<b>SODIUM Hydroxide, with Lime</b> .....	Merck Blue Label							
Excess of Carbonates less than 5% as CO <sub>2</sub>	Guaranteed Analysis							
Nitrogen.....not more than .0012 as N								
Nitrogen.....none as free NH <sub>3</sub>								
<b>SODIUM Hydroxide, with Lime from Ice-land Spar</b> .....	Merck Blue Label							
Chlorides.....less than 0.001% as Cl	Guaranteed Analysis							
Phosphates.....less than 0.003% as P <sub>2</sub> O <sub>5</sub>								
Sulphur.....less than 0.0015% S								
<b>SODIUM Hydroxide, c. p., from Sodium</b> .....				2.25 cb	.09			
<b>SODIUM Hydroxide, from Sodium</b> .....	Merck Blue Label			2.50	incl			
Sulphates.....less than 0.04% as SO <sub>2</sub>	Guaranteed Analysis							
Chlorides.....less than 0.0025% as Cl								
Nitrogen as nitrates								
nitrites, Ammonia, etc.....less than 0.0012% N								
Nitrogen.....less than 0.002% N <sub>2</sub> O <sub>5</sub>								
Nitrites.....less than 0.0001% as N <sub>2</sub> O <sub>3</sub>								
Phosphates.....less than 0.003% as P <sub>2</sub> O <sub>5</sub>								
Silicates.....not more than 0.02% as SiO <sub>2</sub>								
Aluminum.....not more than 0.0010%								
Calcium.....less than 0.012%								
Heavy metals.....none								
Sodium Carbonate content.....not more than 3.15%								
<b>SODIUM Hydroxide Solution I, 27%—Free</b>								
from Nitrogen.....	Merck Blue Label							
Nitrogen as nitrates, ni-								
trites, Ammonia, etc.....not more than 0.0002%								
<b>SODIUM Hydroxide Solution II, 27%—Free from Nitrogen</b> .....	Merck Blue Label							
Sulphates.....less than 0.025% as SO <sub>2</sub>	Guaranteed Analysis							
Chlorides.....less than 0.005% as Cl								
Silicates.....not more than 0.06% as SiO <sub>2</sub>								
Aluminum.....not over 0.032%								
Calcium.....0.005%								
Heavy metals.....at most a trace								
Sodium Carbonate content.....not over 4%								
Nitrogen as nitrates, ni-								
trites, Ammonia, etc.....less than 0.0002%								
<b>SODIUM Hydroxide Solution III, 15%.....</b>	Merck Blue Label							
Sulphates.....less than 0.025% as SO <sub>2</sub>	Guaranteed Analysis							
Chlorides.....less than 0.005% as Cl								
Nitrogen as nitrates, ni-								
trites, Ammonia, etc.....less than 0.0012% N								
Silicates.....not more than 0.06% as SiO <sub>2</sub>								
Aluminum.....not over 0.032%								
Calcium.....less than 0.05%								
Heavy metals.....at most a trace								
Sodium Carbonate content.....not over 4%								
<b>SODIUM Hyposulphite (See Thiosulphate)</b>								
" Indigosulphonate.....	Merck Blue Label					½ oz.	1.00	incl
" Indigosulphonate.....	Merck Blue Label					½ oz.	.35	incl
Water content.....not over 10%	Guaranteed Analysis							
Tested for Indigo Content								
<b>SODIUM Iodate, c. p.</b> .....		.60	incl					
" Iodide, c. p......		.50	incl					
" Molybdate, c. p......		.35	incl	3.50 cb	.08			
" Monosulphonate (Alizarine)		.55 cb	.04			¼ lb.	1.20	incl
" Nitrate, crystals.....				.15 cc	.04			
" Nitrate, c. p., crystals.....	Baker Analyzed			.25 cb	.08	¼ lb.	.15	incl
CaO.....none	Typical Analysis							
MgO.....0.001%								
Cl.....0.002%								
SO <sub>2</sub> .....0.001%								
I.....none								
<b>*SODIUM Nitrate, crystals</b> .....	Merck Blue Label			.60	incl	¼ lb.	.25	incl
Sulphates.....less than 0.0025% as SO <sub>2</sub>	Guaranteed Analysis							
Chlorides.....less than 0.0015% as Cl								
Chlorates and								
Perochlorates.....less than 0.005% as ClO <sub>4</sub>								
Calcium.....less than 0.01%								
Heavy metals.....none								
Iron.....less than 0.0008%								
Nitrites.....less than 0.00055% as N <sub>2</sub> O <sub>3</sub>								
Iodates.....less than 0.004% as IO <sub>3</sub>								
Potassium.....less than 0.33%								
<b>*SODIUM Nitrate, crystals</b> .....	Kahlbaum "C.F.A."					100 grm.	.55	incl



		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
SODIUM	Nitrate, crystals.....	Kahlbaum "C.f.A."					500 grm.	1.10	incl
	Chloride.....none								
	Chlorate, Perchlorate.....none								
	Sulphate.....none								
	Iodate.....none								
	Nitrite.....none								
	Potassium (flame reaction).....								
	Iron.....faint trace								
	Alkaline earths.....none								
	Heavy earths.....none								
SODIUM	Nitrite, coml., granular.....	Baker Analyzed	.22	cb	.08		1/4 lb.	.15	incl
"	Nitrite, c. p., crystals.....		.45	cb	.09				
	NaNO <sub>2</sub> .....95.6%								
	Fe.....0.0003%								
	Cl.....none								
	SO <sub>3</sub> .....0.002%								
	Insoluble matter.....0.001%								
SODIUM	Nitrite, c. p., sticks.....	Baker Analyzed	.50	cb	.08		1/4 lb.	.15	incl
	(Analysis as above)								
SODIUM	Nitrite, sticks.....	Merck Blue Label	1.20		incl		1/4 lb.	.40	incl
	Chlorides.....less than 0.002% as Cl								
	Sulphates.....less than 0.175% as SO <sub>3</sub>								
	Heavy metals.....none								
SODIUM	Nitrite, Potassium free.....	Merck Blue Label	.25		incl		1/2 lb.	.90	incl
	Potassium.....less than 0.03% as K								
	Chlorides.....less than 0.002% as Cl								
	Sulphates.....less than 0.175% as SO <sub>3</sub>								
	Heavy metals.....none								
SODIUM	Nitroferri cyanide (Nitroprusside).....	Merck Blue Label	.40	cb	.04		1/4 oz.	.30	incl
	Nitroferri cyanide.....		.80		incl				
	Sulphate.....less than 0.01% as SO <sub>3</sub>								
"	Oxalate, coml., powder.....	Baker Analyzed	.25	cc	.04		1/4 lb.	.20	incl
SODIUM	Oxalate, c. p.,.....		.60	cb	.08				
	Fe.....0.0005%								
	Ca.....0.0005%								
	Cl.....none								
	SO <sub>3</sub> .....0.001%								
	CO <sub>2</sub> .....none								
SODIUM	Oxalate, c. p., for standardizing.....	Baker Special					1/4 lb.	.50	incl
SODIUM	Oxalate (Sorensens) 100%.....	Merck Blue Label	.20		incl		1/4 lb.	.60	incl
	Hygroscopic moisture.....not more than 0.01%								
	Sodium Carbonate.....less than 0.0212%								
	Sodium Binoxalate.....less than 0.0224%								
	Chlorides.....less than 0.0001% as Cl								
	Sulphates.....less than 0.025% as SO <sub>3</sub>								
	Iron.....less than 0.0003%								
	Potassium.....less than 0.06%								
	Foreign organic substances.....at most a trace								
SODIUM	Oxalate.....	Kahlbaum "C.f.A."					100 grm.	1.10	incl
"	Oxalate.....	Kahlbaum "C.f.A."					500 grm.	3.45	incl
	Content.....99.93%								
	Moisture.....1.2 mg								
	Chloride.....none								
	Sulphate.....none								
	Sodium Carbonate.....none								
	Binoxalate.....none								
	Organic compounds.....none								
	Potassium (flame reaction).....none								
	Iron.....faint trace								
SODIUM	Perborate.....		.65		incl		1/4 lb.	.30	incl
	Permanganate.....		.35	cc	.04				
* "	Peroxide.....		.85		incl		1/4 lb.	.30	incl
* SODIUM	Peroxide, c. p.,.....	Baker Analyzed	1.00		incl		1/4 lb.	.35	incl
	Na <sub>2</sub> O <sub>2</sub> .....88.5%								
	Fe.....0.002%								
	Al.....0.0003%								
	Cl.....0.0002%								
	SO <sub>3</sub> .....none								
	Insoluble matter.....0.001%								
* SODIUM	Peroxide.....	Merck Blue Label					100 grm.	.70	incl
	Sulphates.....less than 0.015% as SO <sub>3</sub>								
	Chlorides.....less than 0.0015% as Cl								
	Phosphates.....less than 0.06% as P <sub>2</sub> O <sub>5</sub>								
	Nitrogen.....less than 0.003%								
	Silicates.....not more than 0.01% as SiO <sub>2</sub>								
	Heavy metals.....none								
* SODIUM	Peroxide, Carbon free.....		1.30		incl				
* "	Peroxide, c. p., for coal analysis.....	Baker Special	.15		incl	1.25	incl	1/4 lb.	.45
* "	Peroxide, c. p., fused.....		.20		incl	1.50	incl	1/4 lb.	.55
"	Phosphate, c. p., monobasic.....	Baker Analyzed	.75	cb	.08		1/4 lb.	.25	incl
	(NaH <sub>2</sub> PO <sub>4</sub> +4H <sub>2</sub> O).....								
	Fe.....0.0001%								
	Cl.....0.0001%								
	SO <sub>3</sub> .....0.001%								
SODIUM	Phosphate, pure, crystals, dibasic.....		.10	cb	.09				

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>SODIUM Phosphate, anhydrous, powder, dibasic.</b>				.22 cb	.09			
“ <b>Phosphate, c. p., dibasic</b> ( $\text{Na}_2\text{HPO}_4 + 12\text{H}_2\text{O}$ )	Baker Analyzed			.35 cb	.08	1/4 lb.	.15	incl
Fe..... 0.003%	Typical Analysis							
As..... trace								
Cl..... -0.001%								
SO <sub>4</sub> ..... 0.005 %								
<b>SODIUM Phosphate, dibasic</b> ( $\text{Na}_2\text{HPO}_4 + 12\text{H}_2\text{O}$ )	Merck Blue Label			1.00	incl	1/4 lb.	.35	incl
Carbonates..... less than 2% as CO <sub>2</sub>	Guaranteed Analysis							
Sulphates..... less than 0.0075% as SO <sub>4</sub>								
Chlorides..... less than 0.0015% as Cl								
Nitrates..... less than 0.0016% as N <sub>2</sub> O								
Heavy metals..... none								
Arsenic..... less than 0.0005%								
Potassium..... less than 0.4% as K								
<b>SODIUM Phosphate.</b>	Kahlbaum “C.f.A.”					100 grm.	.75	incl
“ <b>Phosphate.</b>	Kahlbaum “C.f.A.”					500 grm.	1.65	incl
Carbonate..... none	Certified Analysis							
Sulphate..... none								
Chloride..... none								
Nitrate..... none in 10								
Arsenic..... none /gram								
Heavy metals..... none								
Potassium (flame reaction)..... faint trace								
<b>SODIUM Phosphate, c. p., anhyd., dibasic.</b>				.60 cb	.08	1/4 lb.	.20	incl
“ <b>Phosphate, c. p., dibasic, (Arsenic free)</b>	Baker Special			.50 cb	.08	1/4 lb.	.20	incl
“ <b>Phosphate, coml., granular, tribasic</b>				.10 cc	.01			
“ <b>Phosphate, c. p., tribasic</b> ( $\text{Na}_2\text{PO}_4 + 12\text{H}_2\text{O}$ )	Baker Analyzed			.90 cb	.08	1/4 lb.	.30	incl
Cl..... 0.056%	Typical Analysis							
SO <sub>4</sub> ..... 0.003%								
As..... trace								
Nitrate..... trace								
<b>SODIUM Phosphate, c. p., meta, (NaPO<sub>3</sub>)</b>				1.20 cb	.08	1/4 lb.	.40	incl
“ <b>Picrocarminate Solution, tested reagent.</b>	Merck Blue Label			.30	incl			
<b>SODIUM Potassium Carbonate, c. p.</b>	Baker Analyzed			.50 cb	.08	1/4 lb.	.20	incl
Na <sub>2</sub> CO <sub>3</sub> ..... 94%	Typical Analysis							
K <sub>2</sub> CO <sub>3</sub> ..... 5%								
Fe..... 0.001%								
SiO <sub>2</sub> ..... 0.002%								
Cl..... 0.001%								
SO <sub>4</sub> ..... 0.002%								
P..... trace								
<b>SODIUM Potassium Carbonate.</b>	Kahlbaum “C.f.A.”					100 grm.	.50	incl
“ <b>Potassium Carbonate.</b>	Kahlbaum “C.f.A.”					500 grm.	1.10	incl
Free alkali..... none	Certified Analysis							
Chloride..... slight trace								
Sulphate..... none								
Nitrate..... none								
Phosphate..... none								
Silica..... none in 10								
Cyanide..... none /grams								
Sulphite..... none								
Thiosulphate..... none								
Alkaline earths..... none								
Alumina..... none								
Heavy metals..... none								
Arsenic..... none								
<b>SODIUM Potassium Carbonate, fused, anhydrous, tested reagent.</b>	Merck Blue Label			1.25	incl	1/4 lb.	.50	incl
“ <b>Potassium Phosphate, c. p.</b>				.50 cb	.07	1/4 lb.	.20	incl
“ <b>Potassium Tartrate, crystals</b> (Rochelle Salts)				.32 cc	.01			
“ <b>Potassium Tartrate, powder</b> (Rochelle Salts).				.32 cc	.01			
“ <b>Potassium Tartrate, c. p. cryst.</b>	Baker Analyzed			.70 cb	.08	1/4 lb.	.24	incl
“ <b>Potassium Tartrate, c. p., powder</b>	Baker Analyzed			.75 cb	.08	1/4 lb.	.24	incl
Fe..... 0.001%	Typical Analysis							
CaO..... none								
Cl..... 0.0002%								
SO <sub>4</sub> ..... -0.001%								
<b>SODIUM Potassium Tartrate, crystals.</b>	Merck Blue Label			.80	incl	1/4 lb.	.30	incl
Calcium..... less than 0.03%	Guaranteed Analysis							
Heavy metals..... none								
Chlorides..... less than 0.0005% as Cl								
Sulphates..... less than 0.175% as SO <sub>4</sub>								
Ammonium compounds..... less than 0.0045% as NH <sub>3</sub>								

## A R T H U R H. T H O M A S C O M P A N Y

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>SODIUM</b>	<b>Pyrophosphate, c. p., crystals...</b>	Baker Analyzed							
	Fe.....	0.0003%							
	MgO.....	none							
	As.....	trace							
		Typical Analysis							
<b>SODIUM</b>	<b>Pyrophosphate.....</b>	Merck Blue Label			.80	incl	¼ lb.	.30	incl
	Phosphates.....	less than 2% as P <sub>2</sub> O <sub>5</sub>							
	Sulphates.....	less than 0.0075% as SO <sub>3</sub>							
	Carbonates.....	less than 2% as CO <sub>2</sub>							
	Chlorides.....	less than 0.0015% as Cl							
	Nitrates.....	less than 0.0010% as NO <sub>3</sub>							
	Heavy metals.....	100.0							
	Arsenic.....	less than 0.0005							
	Potassium.....	less than 0.4% as K							
<b>SODIUM</b>	<b>Pyrophosphate, c. p., dry.....</b>		1.00	cb	.08		¼ lb.	.35	incl
"	Silicate, coml., solution.....		.10	cb	.08		1 gal.	.50	incl
"	Silicate, coml., dry, lump.....		.16	cc	.08				
"	Silicate, coml., powder.....		.20	cc	.04				
"	Silicate, c. p., crystals.....		.50	cb	.08		¼ lb.	.25	incl
"	Silicofluoride, c. p.....		1.00	cb	.08		¼ lb.	.35	incl
"	Stannate, c. p.....		1.00	cb	.08		¼ lb.	.35	incl
"	Sulphate, pure, cryst. or powder.....		.10	cb	.09				
"	Sulphate, c. p., crystals.....	Baker Analyzed	.25	cb	.08		¼ lb.	.15	incl
	Fe.....	0.0001%							
	Cl.....	none							
	CaO.....	none							
	MgO.....	none							
<b>SODIUM</b>	<b>Sulphate.....</b>	Merck Blue Label			.45	incl			
	Substances insoluble in water.....	none							
	Chlorides.....	less than 0.001% as Cl							
	Heavy metals.....	100.0							
	Iron.....	less than 0.0008%							
	Calcium.....	less than 0.02%							
	Magnesium.....	less than 0.005%							
	Arsenic.....	less than 0.0003%							
<b>SODIUM</b>	<b>Sulphate.....</b>	Kahlbaum "C.f.A."					1000 grm.	.90	incl
	Chloride.....	100.0							
	Alkaline earths.....	100.0							
	Iron.....	100.0							
	Arsenic.....	100.0							
	Heavy metals.....	100.0							
	Solution.....	neutral							
<b>SODIUM</b>	<b>Sulphate, c. p., anhyd., powder.....</b>	Baker Analyzed			.35	cb	.07	¼ lb.	.15
	Fe.....	0.0003%							
	CaO.....	none							
	MgO.....	none							
	Cl.....	0.0001%							
		Typical Analysis							
<b>SODIUM</b>	<b>Sulphide, fused.....</b>		.50	cb	.08				
"	Sulphide, brown, crystals.....		.10	cb	.08				
"	Sulphide, c. p., crystals.....	Baker Analyzed	.40	gb	.15		¼ lb.	.15	incl
	Fe.....	0.010%							
	Cl.....	0.010%							
	SO <sub>2</sub> .....	0.050%							
	Polysulphide.....	trace							
<b>SODIUM</b>	<b>Sulphide.....</b>	Merck Blue Label	.65	incl			¼ lb.	.30	incl
	Nitrogen.....	not more than 0.005%							
<b>SODIUM</b>	<b>Sulphide.....</b>	Kahlbaum "C.f.A."					100 grm.	.55	incl
"	Sulphide.....	Kahlbaum "C.f.A."					500 grm.	.95	incl
	Solubility.....	complete							
	Ammonium salts.....	100.0							
	Content, calculated on crystals.....	98.7%							
	Polysulphide.....	trace							
	Moisture.....	remainder							
<b>SODIUM</b>	<b>Sulphide, Solution, 5%.....</b>	Merck Blue Label	.60	incl			¼ lb.	.30	incl
	Nitrogen.....	not more than 0.00056%							
"	Sulphite, pure, crystals.....		.10	cc	.04				
<b>SODIUM</b>	<b>Sulphite, c. p., crystals.....</b>	Baker Analyzed	.25	cb	.08		¼ lb.	.15	incl
	Fe.....	0.0003%							
	CaO.....	0.001%							
	SiO <sub>2</sub> .....	0.001%							
	Cl.....	0.001%							
	SO <sub>2</sub> .....	present							
<b>SODIUM</b>	<b>Sulphite, crystals.....</b>	Merck Blue Label	.50	incl			¼ lb.	.20	incl
	Chlorides.....	less than 0.002% as Cl							
	Heavy metals.....	100.0							
	Arsenic.....	less than 0.0002%							
<b>SODIUM</b>	<b>Sulphite, anhydrous, powder.....</b>		.15	cc	.04				
"	Sulphite, c. p., anhydrous.....	Baker Analyzed	.30	cb	.07		¼ lb.	.15	incl
	Fe.....	0.0003%							
	CaO.....	0.003%							
	SiO <sub>2</sub> .....	0.001%							
	Cl.....	0.010%							
	SO <sub>2</sub> .....	present							
<b>SODIUM</b>	<b>Sulphite, dried.....</b>	Merck Blue Label	.85	incl			¼ lb.	.30	incl
	Chlorides.....	less than 0.002% as Cl							
	Heavy metals.....	100.0							
	Arsenic.....	less than 0.0002%							
<b>SODIUM</b>	<b>Tartrate, c. p.....</b>	Baker Analyzed	.75	cb	.08		¼ lb.	.25	incl

	Maker or Brand	Ounce and pound prices				Price in other size package		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>SODIUM</b> Taurocholate, for use in bacteriological work.....		6.00 cb	.04			15 gr.	.40	incl
" Tetraoxalate, c. p.....		.20	incl	2.00 cb	.08	1/4 lb.	.70	incl
" Thiosulphate, (Hyposulphite), pure, crystals.....				.10 cc	.04			
" Thiosulphate, c. p., crystals.....	Baker Analyzed			.25 cb	.08	1/4 lb.	.15	incl
Fe.....0.0001%	Typical Analysis							
CaO.....none								
SO <sub>2</sub> .....0.230%								
Free S.....none								
<b>SODIUM</b> Thiosulphate, crystals.....	Merck Blue Label			.40	incl	1/4 lb.	.20	incl
Carbonates.....less than 0.17% as CO <sub>2</sub>	Guaranteed Analysis							
Sulphates and sulphites.....less than 0.01% as SO <sub>2</sub>								
Free alkali.....less than 0.01% as NaOH								
Sulphides.....less than 0.013% as S								
Calcium.....less than 0.02%								
<b>SODIUM</b> Thiosulphate.....	Kahlbaum "C.f.A."					500 grm.	.75	incl
" Thiosulphate.....	Kahlbaum "C.f.A."					1000 grm.	1.15	incl
Free alkalis.....none	Certified Analysis							
Sulphate.....none								
Sulphite.....none								
Sulphide.....none								
Carbonate.....none								
Lime.....none								
Content.....99.8%								
Mechanical moisture.....0.19%								
<b>SODIUM</b> Thiosulphate, c. p., crystals....	Baker Special			.40 cb	.08			
" Thiosulphate, c. p., anhydrous.....	Baker Analyzed			.50 cb	.07	1/4 lb.	.15	incl
Fe.....0.002%	Typical Analysis							
CaO.....0.001%								
SO <sub>2</sub> .....0.800%								
Free S.....trace								
<b>SODIUM</b> Tungstate, pure, crystals.....				1.25 cb	.08			
" Tungstate, c. p.....		.20	incl	2.00 cb	.08	1/4 lb.	.70	incl
<b>SODIUM</b> Tungstate.....	Merck Blue Label	.30	incl			1/4 lb.	.80	incl
Proper water content.....12%	Guaranteed Analysis							
Chlorides.....less than 0.001% as Cl								
Sulphates.....less than 0.075% as SO <sub>2</sub>								
<b>SODIUM</b> Tungstate.....	Kahlbaum "C.f.A."					50 grm.	.90	incl
Sulphate.....none	Certified Analysis							
Chloride.....trace								
Residue on ignition.....88.45%								
Tungstic acid.....69.70%								
<b>SOLUTION</b> Acid Phosphomolybdic, 10%..		.15 gb	.05	.80	incl			
" Acid Phosphotungstic, 10%..		.15 cb	.03	1.00 cb	.08			
" Alizarin, (Sodium Monosulphonate) for detection of free HCl in stomach.....				.20 cb	.08			
" Boas', for detection of HCl in gastric juice.....		.15 cb	.03	1.25 cb	.08			
" Chloro-iodide of Zinc, after Schultz.....		.50 gb	.05					
" Congo Red, for detection of free HCl in stomach.....				.80 cb	.08			
" Dimethyl-amido-azo-benzol, 0.5%, for gastric juice analysis (Toepfer).....		.15	incl	.75 cb	.08			
" Doremus, for estimating amount of Urea in Uric Acid				.60 gb	.12			
" Ehrlich's, (Dialzo Reaction)..				.30 gb	.12			
" Esbach's, for estimating amount of Albumen in urine				.25 cb	.08			
" Fehling's, Alkaline.....				.50 cb	.08			
" Fehling's, Copper.....				.50 gb	.12			
" Fehling's, in tablet form, in cartons containing 24 tablets each.....	Burgh's Welcome					carton	.25	incl
" Gas, for analysis with Orsat Apparatus.....								
I. Potassium Hydroxide solution for absorbing CO <sub>2</sub> .....				.80	incl	1 liter	1.40	incl
II. Ammoniacal solution Cuprous Chloride for absorbing CO.....				.80	incl	1 liter	1.40	incl
III. Potassium Pyrogallate solution for absorbing O.....				.80	incl	1 liter	1.40	incl



	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
SOLUTION, Günstberg's, for detection of		.60	incl					
" Haines', for detection of				1.00	incl			
" Hayem's, for diluting blood..		.25	cb	.08				
" Hypobromite, for use in Doremus Ureometer.....		.60	gb	.1				
" Iodine, for detection of Starch, Alcohol- and Vinegar.....		.60	gb	.12				
" Labarraque's.....		.20	incl					
" Lactmoid, indicator.....		.20	incl					
" Litmus, indicator.....		1.00	incl	.08				
" Litmus, according to Kubel and Tiemann, in original packages.....	Kahlbaum					500 grm.	1.80	incl
" Litmus, according to Kubel and Tiemann, in original packages.....	Kahlbaum					1000 grm.	3.50	incl
" Lugol's.....		.25	gb	.12				
" Methyl Orange, indicator.....		.15	incl					
" Millon's, for detection of Proteins.....		.25	incl	2.00	gb	.12		
" Nessler's, for detection of Ammonia and its salts.....		.15	incl	1.00	incl			
" Nylander's.....		.15	incl	1.25	incl			
" Obermayer's.....		.25	incl	1.00	incl			
" Phenolphthalein, 1% alcohol solution.....				.50	cb	.08		
" Phloroglucin-Vanillin, for detection of HCl in gastric juice.....		.60	cb	.03				
" Platinic Chloride, c. p., 5%.....		2.00	incl					
" Platinic Chloride, c. p., 10%.....		3.25	incl					
" Resorcin, for detection of HCl in gastric juice.....		.15	gb	.05	1.40	gb	.12	
" Ruhemann's I, for estimation of Uric Acid.....				.25	cb	.08		
" Ruhemann's II, for estimation of Uric Acid.....				.28	cb	.07		
" Soap, for water analysis.....				1.00	gb	.12		
" Soda, Chlorinated, (Labarraque's).....				.20	incl			
" Toepfer's, for gastric juice analysis.....		.15	incl	.75	cb	.08		
" Toisson's, for diluting blood.....				.50	cb	.08		
" Tropaeolin OO, for detection of HCl in gastric juice.....				1.00	cb	.08		
" Turmeric, indicator.....		.15	incl	1.00	cb	.08		
STANDARD VOLUMETRIC SOLUTIONS are not carried in stock because of their unstable nature. Each order is, therefore, made up specially and cannot be shipped until the day after order is received.								
ACID, Hydrochloric, decinormal.....						liter	1.25	gb .18
" Nitric, decinormal.....						liter	1.25	gb .18
" Oxalic, decinormal.....						liter	1.25	gb .18
" Sulphuric, decinormal.....						liter	1.25	gb .18
AMMONIUM Sulphocyanide, decinormal.....						liter	1.35	gb .18
IODINE, decinormal.....						liter	1.35	gb .18
POTASSIUM Bichromate, decinormal.....						liter	1.25	gb .18
" Hydrate, decinormal.....						liter	1.25	rb .14
" Permanganate.....						liter	1.25	gb .18
SILVER NITRATE, decinormal.....						liter	1.35	gb .18
SODIUM Carbonate, decinormal.....						liter	1.25	gb .18
" Chloride, decinormal.....						liter	1.25	gb .18
" Hydrate, decinormal.....						liter	1.25	rb .14
" Thiosulphate, decinormal.....						liter	1.25	gb .18
SORBIT.....				.10	cb	.04		
STARCH, c. p.....		.35	cb	.03				
" iodized.....				.15	cb	.04		
" lactoid.....		.15	cb	.03				
" soluble.....				.30	incl			
" wheat.....								
STRONTIUM Acetate, c. p.....	Baker Analyzed	1.25	cb	.08		14 lb.	.40	incl
" Carbonate, pure, pptd.....		.50	cb	.09				

## A R T H U R H. T H O M A S C O M P A N Y

		Maker or Brand	Ounce and pound prices				Price in other size packages		
			per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
<b>STRONTIUM</b>	Carbonate, c. p.....	Baker Analyzed			.50	cb .08	¼ lb.	.20	incl
	Fe.....0.002%								
	BaO.....-0.001%	Typical							
	Cl.....0.0005%	Analysis							
	SO <sub>4</sub> .....-0.001%								
<b>STRONTIUM</b>	Chloride, pure, crystals.....				.25	cb .09			
"	Chloride, c. p.....	Baker Analyzed			.50	cb .08	¼ lb.	.20	incl
	Fe.....0.001%								
	BaO.....0.001%	Typical							
	CaO.....0.005%	Analysis							
	SO <sub>4</sub> .....0.001%								
<b>STRONTIUM</b>	Chloride, c. p.....	Baker Special			.75	cb .08	¼ lb.	.25	incl
	Fe.....0.0002%								
	BaO.....none	Typical							
	CaO.....none	Analysis							
	SO <sub>4</sub> .....none								
<b>STRONTIUM</b>	Fluoride, c. p.....	Baker Analyzed			1.00	cb .08	¼ lb.	.35	incl
"	Hydroxide, c. p.....				1.00	cb .08			
"	Nitrate, granular.....				.20	cc .04			
<b>STRONTIUM</b>	Nitrate, c. p.....	Baker Analyzed	.10	incl	.50	cb .07	¼ lb.	.20	incl
	Fe.....0.0005%								
	BaO.....0.001%	Typical							
	CaO.....0.001%	Analysis							
	Cl.....none								
<b>STRONTIUM</b>	Nitrate, c. p.....	Baker Special			.75	cb .07			
	Fe.....-0.0001%								
	BaO.....none	Typical							
	CaO.....none	Analysis							
	Cl.....0.002%								
<b>STRONTIUM</b>	Oxalate, c. p.....	Baker Analyzed			.90	cb .09	¼ lb.	.35	incl
"	Oxide, c. p., hydrated.....				1.00	cb .07			
<b>STRONTIUM</b>	Sulphate, c. p.....	Baker Analyzed			.50	cb .07	¼ lb.	.20	incl
	CaO.....none								
	BaO.....trace	Typical							
	Fe.....0.005%	Analysis							
	Cl.....0.035%								
<b>STYRAX</b>					.50	cb .08			
<b>SULPHIDE</b>	Cubes (See Cubes).....								
<b>SULPHITE</b>	Cubes (See Cubes).....								
<b>SULPHUR</b> ,	rolls (Brimstone).....				.10	cc .04	5 lb.	.25	incl
"	sublimed (Flowers of Sulphur)				.10	cc .04	5 lb.	.25	incl
"	washed.....				.15	cc .04			
"	precipitated.....				.16	cc .05			
"	crystals.....				.50	incl			
"	Dioxide, gas, in valve top						per cyl. 6.00	incl	
"	cylinders of 7 lbs. ea.,.....								
"	Monochloride.....				.50	gb .20			
<b>SYNTHOL</b>					.45	cb .09			
<b>TALCUM</b> ,	powder.....				.10	cc .04			
<b>TANNIN</b> (See Acid Tannic).									
<b>Tartar Emetic</b> (See Antimony Potassium Tartrate).									
<b>TEST PAPER</b> ,	Congo, sheets 210 x 250 mm.....						quire .75	incl	
"	" Congo, in books of 25 strips.....						book .05	incl	
"	" Congo, vials of 100 strips.....						vial .10	incl	
"	" Congo, tape form in rolls.....						roll .10	incl	
"	" Litmus, blue, red or neutral in sheets, 210 x 250 mm.....						quire .75	incl	
"	" Litmus, blue, red or neutral, in books of 25 strips.....						book .05	incl	
"	" Litmus, blue, red or neutral, in vials of 100 strips.....						vial .10	incl	
"	" Litmus, blue, red or neutral, in tape form.....						roll .10	incl	
"	" Litmus, red and blue combined, tape form.....						roll .25	incl	
"	" Tumeric, sheets, 2'0 x 250 mm.....						quire .75	incl	
"	" Tumeric, books of 25 strips.....						book .05	incl	
"	" Tumeric, vials of 100 strips.....						vial .10	incl	
"	" Tumeric, tape form.....						roll .10	incl	
<b>TETRAMETHYL - PARAPHENYLENE - DIAMINE HYDROCHLORIDE</b> .....		Merck Blue Label					5 grn.	.75	incl
<b>TETRAMETHYL - PARAPHENYLENE - DIAMINE HYDROCHLORIDE</b> .....		Merck Blue Label					15 grn.	2.00	incl
	Inorganic matter.....less than 0.05%								
<b>THALLIUM</b> ,	metal.....		1.80	incl			1 grm.	.15	incl
"	Nitrate.....		1.80	incl			1 grm.	.15	incl

## A R T H U R H. T H O M A S C O M P A N Y

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
THALLIUM, Sulphate .....		1.80	incl			1 grm.	.15	incl
THORIUM, metal, c. p. ....						0.1 grm.	1.80	incl
“ Nitrate, c. p. ....		.50	incl	6.50	incl			
“ Sulphate, c. p. ....		1.00	incl					
THYMOL, crystals .....		.25	cb	.04	3.10	cb	.09	
THYMOL, .....	Merck Blue Label	.35	incl			1/4 lb.	1.00	incl
Inorganic matter.....less than 0.05%								
Free acids.....none	Guaranteed							
Phenol.....none	Analysis							
TIN, foil, coml. ....				.15	incl			
“ foil, pure (Lead free) .....				.90	incl			
TIN, metal, granulated (mossy), shot or								
“ sticks.....	Baker Analyzed			.90	incl	1/4 lb.	.25	incl
“ metal, powdered.....	Baker Analyzed			1.00	cb	1/4 lb.	.25	incl
Fe.....0.0003%								
Pb.....0.001%	Typical							
Zn.....none	Analysis							
Cu.....none								
As.....trace								
TIN, metal, granulated.....	Merck Blue Label			1.50	incl	1/4 lb.	.50	incl
Lead.....not more than 0.00683%								
Copper.....less than 0.0004%								
Iron and Zinc.....not over 0.04% as Sulphides	Guaranteed							
Antimony.....at most a trace	Analysis							
Arsenic.....at most a trace								
TIN Chloride, crystals, (stannous).....				.45	cb	.08		
“ Chloride, c. p., (stannous).....	Baker Analyzed			.70	cb	.07	1/4 lb.	.24
Fe.....0.0003%	Typical							
As.....trace	Analysis							
SO <sub>2</sub> .....none								
TIN Chloride, (stannous).....	Merck Blue Label	.20	incl			1/2 lb.	.75	incl
Sulphates.....less than 0.155% as SO <sub>4</sub>								
Ammonium compounds.....less than 0.0035% as NH <sub>4</sub>	Guaranteed							
Earths and alkalies.....not more than 0.1%	Analysis							
Iron.....less than 0.00075%								
Arsenic.....less than 0.00075%								
TIN Chloride, crystals, (stannous).....	Kahlbaum “C.f.A.”					100 grm.	.95	incl
“ Chloride, crystals, (stannous).....	Kahlbaum “C.f.A.”					500 grm.	2.70	incl
Content (SnCl <sub>2</sub> + 2H <sub>2</sub> O).....96.22%								
Residue present after precipi-								
tating Tin.....1.2 mg								
Iron.....trace	Certified							
Arsenic.....none	Analysis							
Ammonium salts.....faint trace								
Sulphate.....none								
TIN Chloride, c. p., crystals, (stannic).....	Baker Analyzed			.75	gb	.15	1/4 lb.	.25
Fe.....0.0002%	Typical							
As.....trace	Analysis							
SO <sub>2</sub> .....none								
Na.....trace								
TIN Chloride, c. p., fuming, (stannic).....				1.00	gb	.15	1/4 lb.	.35
TIN Chloride, Solution.....	Merck Blue Label			1.20	inc.	1/4 lb.	.40	incl
Substance precipitated by Alcohol.....none	Guaranteed							
Sulphuric Acid.....less than 0.002% as SO <sub>4</sub>	Analysis							
TIN Oxalate, c. p., (stannous).....	Baker Analyzed			1.25	cb	.07	1/4 lb.	.45
“ Oxide, c. p., (stannous).....		.20	incl	2.00	cb	.06	1/4 lb.	.70
“ Oxide, c. p., (stannic).....	Baker Analyzed			.90	cb	.06	1/4 lb.	.35
Fe.....0.0002%	Typical							
Cl.....0.010%	Analysis							
SO <sub>2</sub> .....0.001%								
Na.....trace								
TIN Phosphate, c. p., (stannous).....	Baker Analyzed			2.50	cb	.08	1/4 lb.	.80
“ Sulphate, c. p., (stannous).....	Baker Analyzed			1.25	cb	.07	1/4 lb.	.40
Fe.....0.0002%	Typical							
As.....none	Analysis							
Cl.....0.001%								
Na.....trace								
TIN Sulphide, c. p., (stannous).....	Baker Analyzed			1.50	cb	.08	1/4 lb.	.50
“ Sulphide, c. p., (stannic).....				2.50	cb	.08	1/4 lb.	.80
TITANIUM, metal, c. p. ....		3.50	incl			1 grm.	.20	incl
“ Sulphate, pure.....		1.10	incl			1 grm.	.15	incl
“ Oxide (See Acid Titanic).....								
“ Potassium Oxalate, c. p. ....				.75	cb	.07	1/4 lb.	.25
TOLUIDINE, ortho, c. p. ....				1.00	cb	.05		
“ para, c. p. ....				3.50	cb	.08		
“ (Toluol), coml. ....				.20	cb	.08	1 gal.	.70
“ (Toluol), c. p. ....				.30	cb	.08	5 gal.	3.00
“ (Toluol) p. ....							1 gal.	.85
							5 gal.	3.25
TRICHLOROETHYLENE.....				.25	cb	.08		
TRIKRESOL.....				.40	incl			
TRIPOLI, powder.....				.10	cc	.04		
TROPAEOLIN, 900, No. 1.....		.20	incl					
“ 900, No. 2.....		.20	incl					

	Maker or Brand	Ounce and pound prices				Price in other size packages	
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg. cont.
TUMERIC, powder.....				.25	ce .04		
“ paper (See Test Paper).....							
TUNGSTEN, metal (Wolfram) c. p., powd..		.75	cb .03				
“ Oxide (See Acid Tungstic).....							
*TURPENTINE, ozonized.....				.30	cb .08		
“ rectified.....				.40	cb .00		
“ Venice.....				.40	cb .07		
“ white.....				.15	cb .08	1 gal.	.85 cn .25
URANIUM Acetate, c. p.....		.60	incl				
URANIUM Acetate, free from Sodium.....	Merck Blue Label	.80	incl			¼ lb.	2.50 incl
Sulphates..... less than 0.0035% as SO <sub>4</sub>							
“ not more than 0.046% as Na							
Earths..... less than 0.005% as Ca	Guaranteed Analysis						
Uranous salts..... not more than 0.2385% UIV							
Foreign metals..... none							
*URANIUM Nitrate, c. p.....		.45	incl				
*URANIUM Nitrate.....	Merck Blue Label	.65	incl			¼ lb.	2.00 incl
Sulphates..... less than 0.0025% as SO <sub>4</sub>							
Alkali salts..... less than 0.05%	Guaranteed Analysis						
“ less than 0.005%							
Uranous salts..... not over 0.2385% UIV							
Foreign metals..... none							
UREA, c. p.....		.25	incl				
VANADIUM Chloride c. p.....		1.50	incl				
VANILLIN.....		.45	incl				
VASELINE (See Petrolatum).....							
VERMILION, English.....		.10	cb .03	1.10	cb .08		
VOLUMETRIC SOLUTIONS (See Solutions).....							
WATER, Distilled, in 5 gal. crated bottle.....						.75	cb 1.00
WATER, glass, (See Sodium Silicate).....							
WAX, (Beeswax) white.....				.55	incl		
“ (Beeswax) yellow.....				.50	incl		
“ Carnauba.....				.85	incl		
“ Japan.....				.25	incl		
“ for plastic reconstruction, special prices on application.....							
*XYLENE (Xylol).....				.30	cb .08	1 gal.	2.00 cn .25
“ (Xylol).....						2 gal.	3.75 cn .35
“ (Xylol).....						5 gal.	8.00 cn .50
“ (Xylol).....	Merck			.30	cb .10		
*XYLENE (Xylol), c. p.....	Baker Analyzed			1.00	cb .08		
Sp. gr..... 0.85	Typical Analysis						
B. P..... 137-140°C							
XYLIDINE.....	Merck Blue Label			2.00	incl	¼ lb.	.65 incl
Substances insoluble in Hydrochloric Acid..... none	Guaranteed Analysis						
XYLOSE.....						1 grm.	.80 incl
“.....						10 grm.	7.00 incl
*YTRIUM Nitrate, c. p.....		3.00	incl				
ZINC, metal, coml., granulated (mossy zinc), for making Hydrogen.....				.20	ce .04	10 lb.	1.50 incl
ZINC, metal, c. p., mossy, stick or shot.....	Baker Analyzed			.30	incl	¼ lb.	.15 incl
Fe..... 0.021%							
As..... trace	Typical Analysis						
Pb..... 0.050%							
Cd..... 0.001%							
ZINC, metal (Arsenic free), granulated, thick sticks, thin sticks.....	Merck Blue Label			.60	incl	¼ lb.	.25 incl
Arsenic..... less than 0.000025%							
ZINC, metal, c. p., mossy, free from Carbon and Arsenic, containing traces of Iron.....				.30	incl		
ZINC, metal, c. p., powdered, 20 mesh.....	Baker Analyzed			.45	incl	¼ lb.	.15 incl
“ metal, c. p., powdered, 30 mesh.....	Baker Analyzed			.30	incl	¼ lb.	.15 incl
Fe..... 0.021%							
As..... trace	Typical Analysis						
Pb..... 0.050%							
Cd..... 0.001%							
ZINC, metal, (Arsenic free) coarse powder.....	Merck Blue Label			.80	incl	¼ lb.	.30 incl
Arsenic..... less than 0.000025%							
ZINC, metal, c. p., special, mossy, stick or shot.....	Baker Analyzed			.35	incl	¼ lb.	.15 incl
Fe..... 0.001%							
As..... none	Typical Analysis						
Pb..... 0.005%							
Cd..... none							



	Maker or Brand	Ounce and pound prices			Price in other size packages		
		per oz.	cont.	per lb.	size pkg.	per pkg.	cont.
ZINC, metal, free from Arsenic, nearly free from Iron, granulated, thick sticks, thin sticks or plates.....	Merck Blue Label	.80	incl		¼ lb.	.30	incl
Arsenic.....less than 0.000025%	Guaranteed Analysis						
Matter oxidizable by Potassium Permanganate.....less than 0.02% as Fe							
ZINC, metal, c. p., powdered, 20 mesh....	Baker Special	.50	incl		¼ lb.	.15	incl
metal, c. p., powdered, 30 mesh....	Baker Special	.45	incl		¼ lb.	.15	incl
Fe.....0.001%	Typical Analysis						
As.....none							
Pb.....0.005%							
Cd.....trace							
ZINC, metal, free from Arsenic, Sulphur, Phosphorus and Iron, granulated, thick sticks or thin sticks.....	Merck Blue Label	1.00	incl		¼ lb.	.35	incl
Arsenic.....less than 0.000025%	Guaranteed Analysis						
Matter oxidizable by Potassium Permanganate.....less than 0.0056% Fe							
Compounds of Sulphur, Phosphorus, etc.....none							
ZINC, metal, dust.....		.17 cc	.02				
ZINC, metal, c. p., dust.....	Baker Analyzed	.20 cb	.06				
Zn.....82.3%	Typical Analysis						
Fe.....0.010%							
Pb.....0.800%							
Cd.....0.500%							
ZINC, metal, dust.....	Merck Blue Label	.60	incl		¼ lb.	.25	incl
Tested for value of Zinc Dust.....	Guaranteed Analysis						
Nitrogen.....not more than 0.0012%							
ZINC, metal, filings, free from Arsenic.....	Merck Blue Label	1.00	incl		¼ lb.	.35	incl
Arsenic.....less than 0.000025%							
ZINC, metal, filings, free from Arsenic, nearly Iron free.....	Merck Blue Label	1.10	incl		¼ lb.	.35	incl
Arsenic.....less than 0.000025%	Guaranteed Analysis						
Matter oxidizable by Permanganate.....less than 0.028% as Fe							
ZINC, sheet (4 x ½ inches), for standardizing.....	Baker Analyzed	.25	incl		¼ lb.	.15	incl
As.....trace	Typical Analysis						
Pb.....0.01%							
Fe.....0.010%							
Cd.....none							
ZINC, metal, amalgamated.....		.50	incl		¼ lb.	.25	incl
metal, platinized.....		.75	incl		¼ lb.	.25	incl
Acetate, pure.....		.30 cb	.09				
ZINC Acetate, c. p.....	Baker Analyzed	.40 cb	.09		¼ lb.	.15	incl
Fe.....0.002%	Typical Analysis						
Cd.....trace							
Sn.....0.01%							
Pb.....0.01%							
ZINC Arsenite, c. p. (ortho).....		1.75 cb	.07		¼ lb.	.60	incl
Borate, c. p.....		1.40 cb	.03		¼ lb.	.50	incl
Bromide, c. p.....		.20	incl				
ZINC Carbonate, c. p.....	Baker Analyzed	.50 cb	.09		¼ lb.	.20	incl
Chloride, fused, pure.....		.25 gb	.14				
ZINC Chloride, c. p., granular.....	Baker Analyzed	.35 cb	.07				
Chloride, c. p., sticks.....	Baker Analyzed	.50 cb	.08				
Fe.....0.002%	Typical Analysis						
Pb.....trace							
Cd.....0.005%							
Mn.....0.005%							
ZINC Chloride, powder.....	Merck Blue Label	.60	incl		¼ lb.	.25	incl
Excess of Zinc Oxychloride less than 2.5% ZnO	Guaranteed Analysis						
Sulphates.....less than 0.002% as SO <sub>2</sub>							
Foreign metals.....none							
Alkalies.....less than 0.05% Alkali Salts							
ZINC Iodide-Starch, solution.....	Merck Blue Label	.65	incl		¼ lb.	.20	incl
Tested for.....Sensitivity							
ZINC Nitrate, c. p.....	Baker Analyzed	.45 cb	.08		¼ lb.	.15	incl
Fe.....0.001%	Typical Analysis						
Pb.....0.001%							
Cd.....-0.001%							
SO <sub>2</sub> .....none							
ZINC Nitrate, c. p., sticks.....		.60 cb	.08		¼ lb.	.30	incl
Oxide, white.....		.14 cb	.09				
ZINC Oxide, c. p., dry process.....	Baker Analyzed	.35 cb	.09		¼ lb.	.15	incl
Mn.....trace	Typical Analysis						
Fe.....0.001%							
Pb.....0.001%							
Cd.....trace							

## A R T H U R H. T H O M A S C O M P A N Y

		Ounce and pound prices				Price in other size packages				
		Maker or Brand		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
ZINC	Oxide, c. p., wet process	Baker Special				.50 cb	.07	¼ lb.	.20	incl
	Mn.....	none								
	Fe.....	0.003%								
	Pb.....	0.003%								
	Cl.....	0.001%								
	SO <sub>4</sub> .....	0.003%								
ZINC	Oxide.....	Merck Blue Label				.85	incl	¼ lb.	.30	incl
	Arsenic.....	less than 0.0015%								
	Sulphates.....	less than 0.0075% as SO <sub>4</sub>								
	Chlorides.....	less than 0.001% as Cl								
	Carbonates.....	less than 1% as CO <sub>3</sub>								
	Nitrates.....	less than 0.0016% as N <sub>2</sub> O <sub>4</sub>								
	Calcium.....	less than 0.02%								
	Magnesium.....	less than 0.005%								
	Foreign Heavy Metals.....	None								
	Foreign bodies which reduce Permanganate when Zinc Oxide is dissolved in dilute Sulphuric Acid.....	none								
*ZINC	Peroxide, c. p.	Baker Analyzed				.30	incl			
"	Phosphate, c. p.	Baker Analyzed				.80 cb	.08	¼ lb.	.30	incl
"	Sulphate, pure, crystals.....	Baker Analyzed				.12 cb	.09			
"	Sulphate, c. p., crystals.....	Baker Analyzed				.25 cb	.08	¼ lb.	.15	incl
	Fe.....	0.001%								
	Pb.....	0.001%								
	Cl.....	trace								
	Cl.....	0.002%								
ZINC	Sulphate.....	Merck Blue Label				.45	incl	¼ lb.	.20	incl
	Chlorides.....	less than 0.001%								
	Foreign metals.....	none								
	Iron.....	less than 0.0008%								
	Nitrate.....	less than 0.0016% as N <sub>2</sub> O <sub>4</sub>								
	Ammonium compounds.....	less than 0.0035% as NH <sub>4</sub>								
	Free Sulphuric Acid.....	none								
	Arsenic.....	less than 0.0035%								
ZINC	Sulphate.....	Kahlbaum "C.f.A."						100 grm.	.50	incl
"	Sulphate.....	Kahlbaum "C.f.A."						500 grm.	.75	incl
	Free Sulphuric Acid.....	none								
	Arsenic.....	none								
	Ammonium salts.....	none								
	Iron.....	none								
	Foreign metals.....	none								
	Chlorine.....	none								
	Nitrate.....	trace								
ZINC	Sulphate, c. p., anhydrous.....					.50 cb	.08	¼ lb.	.20	incl
"	Sulphide, c. p.	Baker Analyzed				1.50 cb	.08	¼ lb.	.50	incl
	Fe.....	0.003%								
	Cd.....	trace								
	Pb.....	0.045%								
	SO <sub>4</sub> .....	0.030%								

## SECTION II

### STAINS AND CHEMICAL PREPARATIONS FOR USE IN MICROSCOPY, BACTERIOLOGY, ETC.

#### Nutrient Media for Bacteriological Cultures

	Maker or Brand	Ounce and pound prices				Price in other size packages		
		per oz.	cont.	per lb.	cont.	size pkg.	per pkg.	cont.
AGAR AGAR, in shreds, prime, white....	A. H. T. Co. No. 40			.85	incl			
" " powder.....	Witte	.25 cb	.05	2.00 cb	.08			
BEEF EXTRACT, in jars.....	Liebig			2.75	incl	¼ lb.	.90	incl
" " ".....	Liebig					½ lb.	1.50	incl
GELATINE, Gold Label.....	A. H. T. Co. No. 33			.60	incl			
" " Extra French.....	Coignet			1.00	incl			
LITMUS MILK (Lakmusmolke künstlich nach Seitz).....	Kahlbaum					100 grm.	.25	incl
" " (Lakmusmolke künstlich nach Seitz).....	Kahlbaum					500 grm.	.75	incl
NUTRIENT MEDIA, after Von Heyden (Nährstoff Heyden), in original tins.....						¼ lb.	1.50	incl
NUTROSE (Casein-Sodium), in original packages.....						¼ lb.	1.00	incl
PEPTONE.....	Witte	.30 cb	.03	3.25 cb	.09			
" in original tins of 10 kilos.....	Witte						67.50	incl

#### Imbedding Media for Section Cutting

CELLOIDIN, shreds.....	Schering	1.00	incl					
PARAFFIN, domestic, melting point about 43° C.....				.15	incl			
" domestic, melting point about 52° C.....				.15	incl			
" best white, imported, melting point 35-37° C.....				.25	incl			
" best white, imported, melting point 40-45° C.....				.25	incl			
" best white imported, melting point 45-50° C.....				.30	incl			
" best white, imported, melting point 50-55° C.....				.30	incl			
" best white, imported, melting point 60-62° C.....				.40	incl			
" best white, imported, melting point 74-76° C.....				.60	incl			
" white, filtered, imported, melting point 36° C.....	Gruebler					½ kilo	1.15	incl
" white, filtered, imported, melting point 40-42° C.....	Gruebler					½ kilo	.45	incl
" white, filtered, imported, melting point 44-46° C.....	Gruebler					½ kilo	.50	incl
" white, filtered, imported, melting point 50-52° C.....	Gruebler					½ kilo	.50	incl
" white, filtered, imported, melting point 56-58° C.....	Gruebler					½ kilo	.60	incl
" white, filtered, imported, melting point 60-62° C.....	Gruebler					½ kilo	.65	incl
PITH, for sectioning.....						pkg.	.10	incl

#### Media for Mounting Microscopic Objects and for Finishing Mounts

	20cc. Collapsible Tubes	Ounce	Pound	Containers
ASPHALTUM.....		.10	.25	incl
BALSAM, Canada, dry.....		.50	5.00	incl
" Canada, natural, paper filtered.....	.25	.30	2.00	incl
" Canada, dissolved in Benzol.....	.30	.45	6.00	incl
" Canada, dissolved in Chloroform.....	.30	.45	6.00	incl
" Canada, dissolved in Xylol.....	.30	.45	6.00	incl
" Damar, in Benzol.....		.45	6.00	incl
BELL'S MICROSCOPIC CEMENT.....		.65		incl
BROWN'S TRANSPARENT RUBBER CEMENT.....		.40		incl
BRUNSWICK BLACK.....		.25		incl
DEANE'S MEDIUM.....		.30		incl
FARRANT'S MEDIUM.....		.30		incl

	20 cc. Collapsible Tubes	Outer	Price	Con- tainers
GLYCERINE, camphorated.....		.25		incl
“ “ jelly.....		.30		incl
GOLD SIZE.....		.15	.75	incl
HOLLIS' GLUE.....		.35		incl
MARINE GLUE, colorless.....		.50		incl
“ “ fluid.....		.30		incl
“ “ hard.....		.35		incl
MEYER'S ALBUMEN FIXATIVE.....		.25		incl
WHITE ZINC CEMENT.....		.50		incl

## Media for Mounting Microscopic Objects and for Finishing Mounts

From the Laboratory of Dr. G. Gruebler & Co., Leipzig, Germany. Furnished in original packages only.

	30 gram	100 gram	Con- tainers
BALSAM, Canada, rectified, neutral.....	.60	1.50	incl
MASKENLACK, No. III.....	.25	.60	incl
MONOBROMNAPHTHALIN.....	1.00	2.50	incl
STYRAXLÖSUNG FÜR DIATOMEEN.....	.50	1.50	incl

## Microscopic Stains, Dry

From the Laboratory of Dr. G. Gruebler & Co., Leipzig, Germany. Furnished in original packages only.

Where stains are sold in the original Gruebler packages, we have used the German name in the price list, as experience shows users of these goods to be quite as familiar with the German, as with the English equivalent.

	Author	1 Gram	10 Grams	25 Grams	100 Grams	Cont.
A.—METHYLENBLAU-EOSIN (Reuter).....		.38	3.60			incl
ACETINBLAU.....			.25			incl
ACID CARMINIC, Ia.....		.20	1.88			incl
“ “ IIa.....		.15	1.25			incl
ACRIDINORANGE.....			.35			incl
ACRIDINROT.....			.30			incl
AETHYLIOLETT.....			.35			incl
ALAUN-CARMIN sicc (Grenacher's solution of Alum- carmine is obtained by dissolving this dry stain in from 20 to 25 parts of boiling water).....			.83			incl
ALIZARIN KRIST, Spalteholz.....		.33	3.00			incl
ALIZARINBLAU S.....	Ehrlich		.30			incl
ALIZARIN I SICC., Rawitz.....			.40			incl
ALIZARIN SULFACIDE, Metschnikoff.....			.35			incl
ALIZARIN SICC.....			.40			incl
ALIZARINCYANIN, Rawitz.....			.33			incl
ALIZARINCYANIN, Spalteholz.....		.33	3.00			incl
ALIZARINGRÜN B.....			.30			incl
ALIZARINSULFOSAURES NATRON.....			.33			incl
ALKALIBLAU.....			.33			incl
ALKALIGRÜN.....			.38			incl
ALKANIN, fettlösli, Rot.....			.30			incl
AMMONIAK-CARMIN.....	Hoyer	.23	2.00			incl
ANILIN (-SALZE) CHLORHYDRAT.....			.10			incl
“ “ SCHWEFELSAURES.....			.13			incl
ANILINBLAU soluble in alcohol.....			.35			incl
“ “ soluble in water.....			.33			incl
ANILIN-BLUE-BLACK.....			.35			incl
ANILINGELB.....			.25			incl
ANILINGRÜN.....	Strasburger		.30			incl
ANTHRACENBLAU, Kaplan.....			.30			incl
AURAMIN.....			.30			incl
AURANTIA.....			.45			incl
AZOBLAU.....			.30			incl
AZOCARMIN.....			.25			incl
AZUR I.....	Giemsa	2.50				incl
“ II.....	Giemsa	1.25				incl
“ II, Eosin.....	Giemsa	1.88				incl
BENZOAZURIN.....			.33			incl
BENZOPURPURIN.....			.30			incl
BERLINERBLAU (See Colors for Injecting).....	Birch-Hirschfeld		.30			incl
BIEBRICHER SCHARLACH.....	Griesbach		.30			incl
BIONDI-EHRlich-HEIDENHAIN three color mix- ture, dry "Gruebler".....			1.45			incl
BISMARCKBRAUN.....	Weigert		.20	.44	1.75	incl
BITTERMANDELÖLGRÜN.....			.30			incl



	Author	1 Gram	10 Grams	25 Grams	100 Grams	Cont.
BLACKLEY-BLAU (See Anilin-blue-black).....						
BLAUHOLZEXTRACT (See Campecheholzextract)...						
BLAUSCHWARZ.....			.33			incl
BLEU DE LYON.....	Griesbach		.30			incl
BORAXCARMIN SICC.....			.90			incl
BORDEAUX R.....	Griesbach		.30			incl
BRASILIN.....		.25				incl
BRILLIANTBLAU, EXTRA GRÜNlich.....			.40			incl
BRILLANT-CRESYBLAU.....			.35			incl
BRILLANTGRÜN.....			.30			incl
BRILLANTSCHWARZ.....			.35			incl
CAMPECHEHOLZEXTRACT.....	Paneth		.10			incl
CARMALAUN SICC. "Gruebler" (P. Mayer's alum carmine solution is obtained by dissolving this dry stain in hot water).....			.60			incl
CARMIN RUBR. OPT.....			.43			incl
CARMIN II.....			.38			incl
CARMINS. AMMONIAK (See Ammoniak-Carmin)...						
CARMINSÄURE (See Acid Carminic).....						
CARMINS. NATRON (See Natron Carmin).....						
CHINABLAU.....			.35			incl
CHINAGRÜN (for typhoid cultures).....			.25			incl
CHINOLINBLAU (See Cyanin).....						
CHLORHYDRINBLAU.....	Kühne		.25			incl
CHROMOGEN, for neuroglia staining.....	Weigert		.20			incl
CHROMOTROP.....			.25			incl
CHRYSAMIN.....			.25			incl
CHRYSOIDIN.....			.25			incl
COCCININ.....			.30			incl
COCCIONELLA IA, pulv.....				.15	.60	incl
COERULEIN S.....			.30			incl
CONGOCORINTH G.....			.30			incl
CONGOROT, Nissl.....			.33	.75	3.00	incl
CORALLIN, soluble in alcohol and caustic solution..	Strausburger		.25			incl
soluble in water.....			.25			incl
CRESYLECHT-VIOLETT.....			.30			incl
CRYSTALLVIOLETT.....			.30			incl
" (Höchst).....			.30			incl
CROCEIN.....	Griesbach		.30			incl
CROCEINSCHARLACH 7 B.....			.30			incl
CURCUM EIN N.....			.20			incl
CYANIN.....		.75	7.00			incl
DAHLIA.....			.30			incl
DIAMANTFUCHSIN.....			.33			incl
ECHTGRÜN + DINITROSORESORCIN, Platner.....			.28			incl
ECHTROT.....			.50			incl
EOSIN A. G.....			.35			incl
EOSIN B. A.....			.30			incl
" soluble in water, yellowish.....			.30	.65	2.50	incl
" soluble in water, bluish.....			.25			incl
" soluble in alcohol.....			.30			incl
" pure, French, for blood staining.....			.30			incl
EOSIN-METHYLENBLAU.....		.18	1.65			incl
" " Jenner.....	May-Grünwald	.25	2.25			incl
" ".....	Leishman	.38	3.50			incl
" ".....	Reuter	.38				incl
ERYTHROSIN, PUR.....			.45			incl
FLUORESC EIN, Czapslewsky.....	Kühne		.45			incl
FLUORESC EIN-KALIUM.....			.35			incl
FUCHSIN, for bacilli staining.....			.25	.56	2.25	incl
FUCHSIN S. (Acid Fuchsin).....	Weigert		.30	.63	2.50	incl
FUCHSIN-METHYLENBLAU.....			.68			incl
GALL EIN EN PÂTE.....			.10			incl
" SICC.....			.50			incl
GALLOCYANIN.....			.25			incl
GENTIANA-VIOLETT, Gram u.A.....			.25	.60	2.25	incl
GOLDORANGE.....	Griesbach		.20			incl
HAEMALAUN, SICC. "Gruebler" (P. Mayer's Hae- malum solution is obtained by dissolving this dry stain in hot water).....			.60			incl

	Author	1 Gram	10 Grams	25 Grams	100 Grams	Cont.
HAEMATĒIN, PURISS.....		.33				incl
".....	P. Mayer	.35	3.30			incl
HAEMATĒIN-AMMON, PURISS.....	P. Mayer	.33	3.00			incl
HAEMATŌXYLIN, PURISS, KRISTALL.....			.65	1.50	6.00	incl
" (DUNKEL).....			.55	1.25	5.00	incl
HAEMATŌXYLIN-EOSIN.....			.75			incl
HELIANTHIN.....			.20			incl
HESS, BORDEAUX.....			.35			incl
HEXAMETHYLVIOLETT (See Methylviolett 6 B).....						
HOFMANN'S VIOLETT.....			.35			incl
JANUSGRÜN.....			.30			incl
JENNER'S STAIN.....		.25	2.25			incl
INDIG-CARMIN (Indigo-Sulphonate of Soda).....			.45			incl
INDIG-CARMIN (Indigo-Sulphonate of Soda) Ia opt. for Heidenhain's kidney injection. See Colors for Injecting).....						
INDULIN.....			.35			incl
JODEOSIN SICC.....			.45			incl
JODGRÜN, Griesbach u.A. (Ersatz.....			.50			incl
KRESOFUCHSIN.....		.25				incl
LACIUS STAIN, Neutral.....	Czaplewsky	1.10				incl
LEISHMAN STAIN.....		.38	3.50			incl
LEUKOANILIN (Leuko-Fuchsin.....			1.25			incl
LEUKOBLAU.....			1.25			incl
LEUKOBRILLIANTGRÜN.....			1.25			incl
LEUKOMALACHITGRÜN.....			1.25			incl
LICHTGRÜN F. S., Benda u.A.....			.25			incl
MAGDALROT, echt.....		.45				incl
" des Handels.....			.40			incl
MAGENTAROT.....			.35			incl
MALACHITGRÜN.....			.30			incl
" Ia.....			.35			incl
" KRIST (Double salt of Zinc Chloride).....						
MARTIUSGELB.....			.38			incl
MAUVEIN.....		.25				incl
MAY-GRÜNWARD'S STAIN.....		.25				incl
METANILGELB, Kristall. Ia.....	Griesbach		.30			incl
METHYLBLAU.....			.40			incl
METHYL-EOSIN.....			.38			incl
METHYLGRÜN.....			.38			incl
" KRIST. OO, yellowish.....			.50			incl
METHYLORANGE.....		.25				incl
METHYLVIOLETT B. N.....			.35			incl
" 5 B.....			.30			incl
" 1 B.....			.38			incl
" 2 B.....			.25			incl
" 6 B (Hexamethyl-violett).....			.35			incl
METHYLENBLAU, for bacilli staining.....	Koch		.30	.65	2.50	incl
" (See Colors for Injecting).....	Ehrlich					incl
" B. X.....	Siegmund Mayer		.45			incl
" medic, pur.....	Guttmann & Ehrlich					
" rein L. F.....			.50	1.25	4.75	incl
METHYLENBLAU-EOSIN, Jenner.....	May-Grünwald	.25	2.25			incl
METHYLENBLAU.....	Leishman	.38	3.50			incl
METHYLENGRÜN.....			.38			incl
METHYLVIOLETT.....			.35			incl
MUCICARMIN, SICC.....	P. Mayer	.28				incl
MUCHAMATEIN.....	P. Mayer	.43				incl
MUSCARIN.....			.50			incl
NACHTBLAU.....			.35			incl
NAPHTALINROT, PUR.....		.50				incl
NAPHTOLGELB S.....			.25			incl
NAPHTOLGRÜN B.....			.25			incl
NAPHTYLAMINBRAUN.....	O. Krüser		.25			incl
NAPHTYLAMINGELB (Naphtolgelb.....			.25			incl
NAPHTYLENBLAU R. in Kristall.....			.38			incl
NATRON-CARMIN.....		.23				incl
NEUTRALROT, rein, nach P. Ehrlich, f. Inj. in vital Gew. zu Graunlargb.-Färbg.....				.75		incl
NIGROSIN.....			.25			incl
NIBLAU-CHLORHYDRAT.....			.45			incl
NIBLAU-SULFAT.....			.40			incl

# A R T H U R H. T H O M A S C O M P A N Y

	Author	1 Gram	10 Grams	25 Grams	100 Grams	Cont.
ORANGE G			.20			incl
ORCEIN, PUR., Israel, Unna u.A.		.18				incl
ORCEIN, spec. f. Elastin-färbung, Unna		.18				incl
OXYORCEIN	Savini	.25				incl
ORSEILLE, Extract			.15			incl
PATENT-SÄURE-RUBIN	Kultschitzky		.30			incl
PHENOSAFRANIN (See Safranin, pure)						
PHLOXINROT	Birch-Hirschfeld		.35			incl
PIKROCARMIN, SICC.	Cuccati	.25				incl
" "	Hoyer	.25				incl
" "	P. Mayer	.25				incl
" "	Ranvier	.25				incl
PIKROLITHIONCARMIN, SICC., "Gruebler" (Solution made by dissolving in boiling distilled water, allowing to stand and then filtering)		.23				incl
PONCEAU P. R.			.25			incl
PURPURIN, SICC. OPT.		.45	4.25			incl
PYRONIN	Pappenheim		.38			incl
RESORCIN-FUCHSIN			2.25			incl
ROMANOWSKY STAIN		.38	3.50			incl
ROSANILIN (-Base)			.45			incl
ROSANILINCHLORHYDRAT			.30			incl
ROSANILIN, salt-petersaures			.35			incl
" schwefelsaures			.35			incl
ROSANILINVIOLETT, Hanstein			.50			incl
ROSAZURIN B.			.50			incl
" G.			.50			incl
ROSE BENGALÉ	Griesbach		.40			incl
ROSOLSAURE			.25			incl
ROTVIOLETT, 5 R. S.	Unna		.30			incl
RUBIN S.			.30			incl
RUTHENIUMROT (MANGIN), per 1-10th gram		1.50				incl
SAFRANIN O., soluble in water, Pfitzner, Flemming			.35			incl
SAFRANIN, pure (Phenosafranin)			.38			incl
" soluble in alcohol			.40			incl
SÄUREALIZARINBLAU			.25			incl
SÄUREALIZARINGRÜN			.25			incl
SÄUREFUCHSIN (See Fuchsin S.)						
SÄUREGRÜN			.28			incl
SÄUREVIOLETT, 1897, Ers. f. Hoffmannsblau			.25			incl
" Kühne			.35			incl
SÄUREBRAUN			.25			incl
SCHARLACH R., Michaelis			.35	.80		incl
SILBERNITRAT-AMMONIAK	Fajerstajn	.43				incl
SMARAGDGRÜN			.30			incl
SOLIDGRÜN			.30			incl
SPILLER'S PURPLE		.65				incl
SUDAN III, for fat staining after Daddi			.30			incl
THIAZINBRAUN			.25			incl
THIAZINROT			.25			incl
THIONIN PUR, Ehrl., Hoyer, Heidenhain		.20	1.50			incl
TOLUIDINBLAU, Hoyer			.35			incl
TROPÄOLIN 00 and 000			.25		2.25	incl
TRYPANROT			.50			incl
URANIN			.35			incl
VESUVINBRAUN	Koch		.25			incl
VICTORIABLau 4 R., Lustgarten			.38			incl
VIOLETTSCHWARZ			.30			incl
VITALNEUROT (Dr. Schulemann)			.50		7.50	incl
WASSERBLAU, Unna u.A.			.35			incl
WOLLSCHWARZ, Löffler, f. Bact.-Geisseln			.25			incl
WRIGHT'S STAIN		.40				incl

## Colors for Injecting

From the Laboratory of G. Gruebler & Co., Leipzig, Germany. Furnished in original packages only.

	Author	1 Gram	10 Grams	100 Grams	1000 Grams	Cont.
BERLINERBLAU, insoluble in water				1.00	8.00	incl
BERLINERBLAU Ia, easily soluble in water			.30	2.65		incl
CARMIN COERULEUM, for Cystoscopy, 1 tube of 20 tablets, per tube		.80				incl
INDIGOCARMIN OPT. Ia pure (Indigosulphonate of Soda), for kidney injection	Heidenhain	.35	3.40			incl

	Author	1 Gram	10 Grams	100 Grams	1000 Grams	Cent.
<b>INJECTIONS—ROT.</b> for injection in vital organs.	Ehrlich	.....	.75	.....	.....	incl
<b>LEIM-INJECTIONSMASSEN—</b> (Gelatine injection mass) blue.....	.....	.....	.....	.40	3.75	incl
“ “ (Gelatine injection mass) red.....	Spalteholz	.....	.....	.50	4.50	incl
“ “ (Gelatine injection mass) yellow.....	Ackerman	.....	.....	.50	4.75	incl
“ “ (Gelatine injection mass) black.....	.....	.....	.....	.50	4.50	incl
“ “ (Gelatine injection mass) red, conc. fast “Gruebler”.....	.....	.....	.....	1.80	17.50	incl
<b>METHYLENBLAU RECTIF.,</b> for injection in vital organs.....	Ehrlich	.15	1.25	.....	.....	incl

## Staining Solutions

From the Laboratory of Dr. G. Gruebler & Co., Leipzig, Germany. Furnished in original packages only.

	10 Grams	25 Grams	100 Grams	Cent.
<b>EHRlich's TRIPLE MIXTURE.</b> .....	.30	1.10	.....	incl
<b>GIEMSA'S SOLUTION,</b> for the Romanowsky method.....	.40	1.50	.....	incl
<b>METHYLENE BLUE POLYCHROMATIC,</b> nach Unna.....	.25	.60	.....	incl
<b>PICROCARMINE,</b> after Weigert.....	.15	.50	.....	incl

## Dry Stains in Tablets, “Soloid” Brand

The tendency of solutions of the aniline dyes to decompose has always been a source of trouble in microscopic work. The “Soloid” Microscopic Stains contain aniline dyes of the highest quality, and make it possible to prepare solutions in small quantities as required. By their use waste is avoided, and correct results are assured. These are supplied in tubes containing six tablets each. Instructions for making solutions are furnished with each tube.

In Loeffler's alkaline methylene blue, aniline gentian violet and Ziehl's carbol fuchsin the solutions obtained are only approximately equivalent to those prepared according to the original formulæ. The figures avoid small fractions in measurement, enabling the solution to be prepared more readily, without diminishing the efficiency of the stain.

	Per tube	Per doz. tubes
<b>BISMARCK BROWN,</b> pure 0.1 gram. Dissolve one “Soloid” Bismarck Brown in 7 cc of absolute alcohol and add 7 cc of distilled water.....	\$0.25	\$2.55
<b>BORAX METHYLENE BLUE.</b> Dissolve one “Soloid” Borax Methylene Blue in 10 cc of distilled water.....	.25	2.55
<b>EHRlich's TRIPLE STAIN</b> (Biondi-Ehrlich-Heidenhain Triple Stain). Dissolve one “Soloid” Ehrlich Triple Stain in 25 cc of distilled water, one “Soloid” Acid Fuchsin in 2 cc of distilled water and mix. The mixture is ready for use and keeps well.....	.30	3.15
<b>EOSIN,</b> pure, 0.1 gram. To obtain a solution of eosin suitable for general staining, one “Soloid” product may be dissolved in 20 cc of 50% alcohol. This gives a 0.5% solution.....	.25	2.55
<b>EOSIN-AZUR</b> (for Giemsa staining), 0.038 gram. Dissolve one “Soloid” product in 5 cc of a mixture of equal parts of glycerine and pure methyl alcohol.....	.50	5.70
<b>EOSIN-METHYLENE BLUE</b> (Louis Jenner's Stain) pure 0.05 gram. Dissolve one “Soloid” product in 10 cc of pure methyl alcohol.....	.25	2.55
<b>FUCHSIN</b> (Basic) pure, 0.1 gram. Dissolve one “Soloid” Fuchsin in 2.5 cc of absolute alcohol and add 10 cc of distilled water.....	.25	2.55
<b>GENTIAN VIOLET,</b> pure, 0.1 gram. Dissolve one “Soloid” Gentian Violet in 7 cc of absolute alcohol and add 7 cc of distilled water.....	.25	2.55
<b>GRAM'S IODINE SOLUTION,</b> 15 cc. Dissolve one “Soloid” product of reagent A in 10 cc of distilled water, add one of reagent B, and when solution is complete, dilute to 15 cc with distilled water.....	.25	2.55
<b>HAEMALUM</b> —Each “soloid” product contains Haematein, .0005 grm, and Ammonia Alum, 0.25 grm. To prepare the stain, one product is ground up with 5 cc of distilled water, and boiled a few minutes. A clear solution is thus obtained.....	.25	2.25
<b>HAEMATOKYLIN,</b> pure, 0.1 gram. Dissolve one “Soloid” Haematoxylin in 1 cc of absolute alcohol and add 2 cc of distilled water.....	.25	2.55
<b>METHYLENE BLUE,</b> pure, 0.1 gram. Dissolve one “Soloid” Methylene Blue in 7 cc of absolute alcohol and add 7 cc of distilled water.....	.25	2.55
<b>METHYL VIOLET,</b> pure, 0.1 gram. Dissolve one “Soloid” product in 1 cc of absolute alcohol and add 5 cc of distilled water.....	.25	2.55
<b>ROMANOWSKY STAIN</b> (Leishman's Modification). Dissolve one “Soloid” product in 10 cc of pure methyl alcohol.....	.25	2.55
<b>ROMANOWSKY STAIN</b> (Wright's Modification). Dissolve one “Soloid” product in 10 cc of pure methyl alcohol.....	.25	2.55
<b>THIONIN BLUE,</b> pure, 0.1 gram. Dissolve one “Soloid” Thionin Blue in 10 cc of absolute alcohol and add 5 cc of distilled water.....	.25	2.55



	Per tube	Per doz. tubes
<b>TOISON BLOOD FLUID.</b> For the preservation of blood corpuscles and the counting of the same. Dissolve one "Soloid" product in 3 cc of glycerine and 16 cc of distilled water. The solution should always be filtered immediately before use. It acts as a simple diluent, prevents clotting and preserves the natural appearance of the red corpuscles. At the same time the nuclei of the white corpuscles are faintly tinted, so as to facilitate their recognition and counting; but no means is afforded for discriminating between the different varieties.	.25	2.55
<b>METHYL ALCOHOL</b> , pure, in hermetically sealed glass phials containing 15 cc.	.25	3.00

### Staining Material in Solution

These solutions are made in every case in accordance with the author's latest formula, and from Gruebler's dry stains. Because of the instability of many of these solutions, we cannot guarantee their performance unless they are used promptly after delivery. We recommend the purchase of dry stains and the preparation of solutions in the laboratory, as the most satisfactory and economical method. The solutions listed below are those for which we have most demand and are kept in stock ready for immediate delivery. Others made promptly to order.

	Author	25 Grams	100 Grams
<b>AMMONIA WATER-GENTIAN VIOLET</b> .....	Weigert.....	.28	.45
<b>ANILINE WATER-GENTIAN VIOLET</b> .....	Gram.....	.25	.45
<b>BIONDI-EHRlich-HEIDENHAIN'S TRIPLE MIXTURE</b> .....	.....	.30	.60
<b>BISMARCK BROWN</b> , saturated aqueous solution.....	.....	.20	.35
" <b>BROWN</b> .....	Weigert.....	.25	.45
" <b>BROWN</b> , saturated alcoholic solution.....	.....	.30	.60
<b>BORAX- CARMINE</b> .....	Grenacher.....	.20	.30
" <b>CARMINE</b> , alcoholic.....	Grenacher.....	.30	.55
<b>CARBOl-FUCHSIN</b> . (Gabbett's Solution I.) For use in staining tuberculi bacilli in connection with Gabbett's Methylene Blue.....	Ziehl-Nielsen...	.25	.40
<b>CARBOl XYLOL</b> , for clearing.....	Weigert.....	.20	.20
<b>CONGO RED</b> .....	.....	.20	.35
<b>CONGO RED SOLUTION</b> in diluted alcohol.....	.....	.30	.55
<b>EHRlich, TRIACID SOLUTION</b> , for neutrophile granules.....	.....	.45	.80
" <b>TRIPLE MIXTURE</b> , for eosinophilous cells.....	.....	.60	1.10
<b>EOSIN, BLUSH</b> .....	.....	.25	.45
" <b>YELLOWISH</b> , saturated alcoholic solution.....	.....	.30	.60
" <b>YELLOWISH</b> , saturated aqueous solution.....	.....	.20	.40
<b>EOSINATE OF METHYLENE BLUE</b> .....	Jenner.....	.40	.75
<b>GABBET, Bacillus Stain, Solution II.</b> For use in staining tuberculi bacilli in connection with Carbol Fuchsin.....	.....	.25	.40
<b>GENTIAN VIOLET</b> , saturated aqueous solution.....	.....	.25	.45
" <b>VIOLET</b> , saturated alcoholic solution.....	.....	.25	.45
" <b>VIOLET</b> .....	Ehrlich.....	.25	.45
<b>GIEMSA'S STAIN.</b> For use in staining malarial parasites. Equal parts of Azure II and Eosin solution ready for use.....	.....	.30	.50
<b>GOLDHORN, Polychrome Methylene Blue</b> .....	.....	.45	1.50
"    " <b>"One-Solution"</b> .....	.....	.60	1.65
<b>HAEMATOTOXYLIN</b> , concentrated.....	Delafield.....	.35	.60
"    " <b>IRON, Solution No. 1</b> .....	Heidenhain.....	.20	.35
"    " <b>IRON, Solution No. 2</b> .....	Heidenhain.....	.30	.50
<b>HARRIS' MODIFICATION OF ROMANOWSKY'S STAIN</b> .....	.....	.40	...
<b>HASTING'S STAIN</b> .....	.....	.50	1.25
<b>IODINE SOLUTION</b> .....	Gram.....	.20	.35
<b>JENNER'S EOSINATE OF METHYLENE BLUE</b> .....	.....	.40	.75
<b>LEISCHMAN'S BLOOD STAIN</b> .....	.....	.30	.75
<b>METHYLENE BLUE</b> , for bacillus.....	Loeffler.....	.25	.45
"    " <b>BLUE, Acetic acid</b> , for diphtheria bacillus.....	Neisser.....	.25	.40
"    " <b>BLUE, (Soap)methylene blue</b> .....	Nissl.....	.30	.50
"    " <b>BLUE, Gabbet's</b> .....	.....	.25	.40
"    " <b>BLUE, Polychromatic</b> .....	Goldhorn.....	.45	1.50
"    " <b>BLUE, saturated alcoholic solution</b> .....	.....	.50	1.00
"    " <b>BLUE, saturated aqueous solution</b> .....	.....	.40	.80
<b>NEUSSER'S STAIN</b> .....	.....	.20	.35
<b>PAPPENHEIM STAIN</b> .....	.....	.20	.35
<b>TINCTURE FOR STAINING ELASTIC TISSUE</b> .....	Weigert.....	.55	1.00
<b>TOISSON SOLUTION</b> .....	.....	.20	.35
<b>VAN GIESON SOLUTION</b> .....	.....	.35	.65
<b>WRIGHT'S STAIN</b> , guaranteed.....	.....	.50	...
<b>ZIEHL-NIELSON CARBOl FUCHSIN</b> .....	.....	.25	.40

# Reagents for Serological Work

These reagents are furnished in original packages only and are manufactured by the H. K. Mulford Company.

	Size pkg.	Per pkg.
AGGLUTINATING SERUM, Cholera.....	1 grm.	2.00
“ SERUM, Typhoid.....	1 grm.	2.00
“ SERUM, Paratyphoid, “A”.....	1 grm.	2.00
“ SERUM, Paratyphoid, “B”.....	1 grm.	2.00
ANTIHUMAN HEMOLYTIC AMBOCEPTOR PAPER.....	10 tests	3.00
ANTISHEEP HEMOLYTIC AMBOCEPTOR.....	1 cc.	5.00
“ HEMOLYTIC AMBOCEPTOR PAPER.....	10 tests	3.00
ANTIGEN-NOGUCHI.....	10 tests	3.00
ANTIGEN, Cholesterin, Fortified.....	10 tests	2.00
BORDEN OUTFIT for Serodiagnosis of Typhoid Fever.....	Outfit	3.50
BASS TEST for Serodiagnosis of Typhoid Fever.....	60-120 tests	2.50
NOGUCHI REAGENTS, Antigen and Amboceptor.....	10 tests	5.00

# Kahlbaum Collections

Kahlbaum collection of 200 different Carbon combinations, in stoppered glass specimen vials with foot, each containing from 15 to 150 cc. of material. Imported to order only. Price “duty free”.....	\$75.00
Kahlbaum collection of 98 substances in glass vials, arranged according to Knorr & Duden for the introduction to the study of organic chemistry. Imported to order only. Price “duty free”.....	9.00
Kahlbaum collection for demonstrations in physical chemistry without loss of material, after Prof. Dr. E. Bosc, experiments 1 to 17, with printed directions, packing included, but without tube No. 8b of Carbonic Acid. Imported to order only.	
Price, “duty free”.....	52.75
Carbonic Acid tube, extra, “duty free”.....	4.80

# Liquified Gases

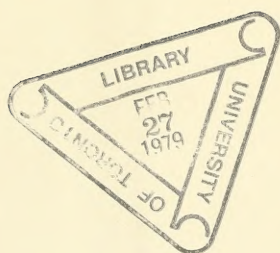
Liquefied Gases, in glass tubes for demonstrations, Kahlbaum. Each tube furnished in a velvet lined case. Imported to order only.

	Duty Free
Ammoniak (Ammonia).....	\$3.20
Chlor (Chlorine).....	3.20
Cyan (Cyanogen).....	5.12
Kohlenoxysulfid (Carbon Oxy-sulphide).....	5.12
Kohlensäure (Carbon Dioxide).....	4.80
Methyläther (Methyl Ether).....	3.84
Methylchlorid (Methyl Chloride).....	2.88
Nitrosylchlorid (Nitrosyl Chloride).....	4.48
Phosgen (Phosgene).....	2.56
Salzsäure (Hydrochloric Acid).....	3.84
Schweflige Säure (Sulphur Dioxide).....	2.56
Schwefelwasserstoff (Hydrogen sulphide).....	5.12
Stickoxydul (Nitrous Oxide).....	5.12
Stickstofftetroxyd (Nitrogen Peroxide).....	4.48









Q  
184  
L35  
1914

Laboratory apparatus and  
reagents

Physical &  
Applied Sci.  
Serials

PLEASE DO NOT REMOVE  
CARDS OR SLIPS FROM THIS POCKET

---

UNIVERSITY OF TORONTO LIBRARY

---



